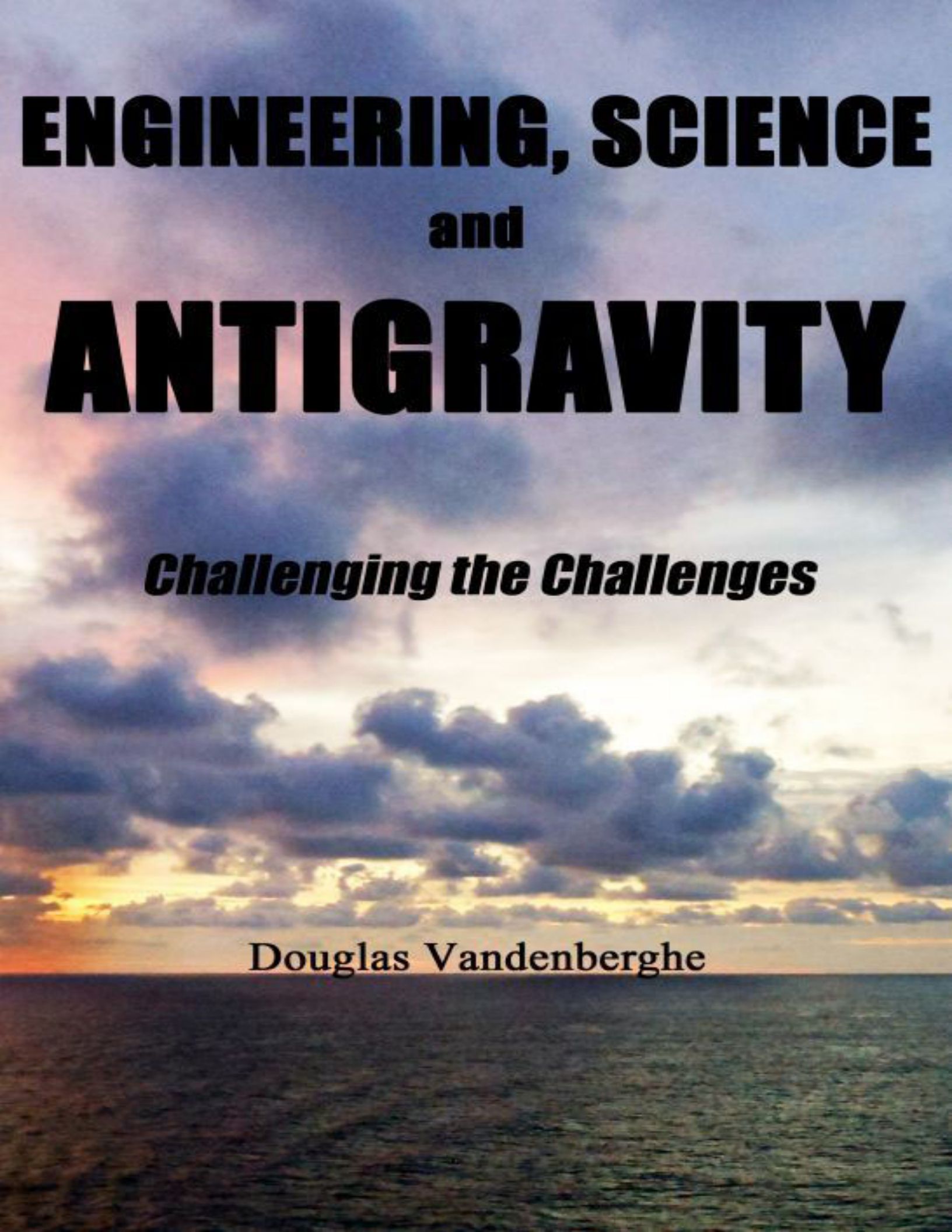
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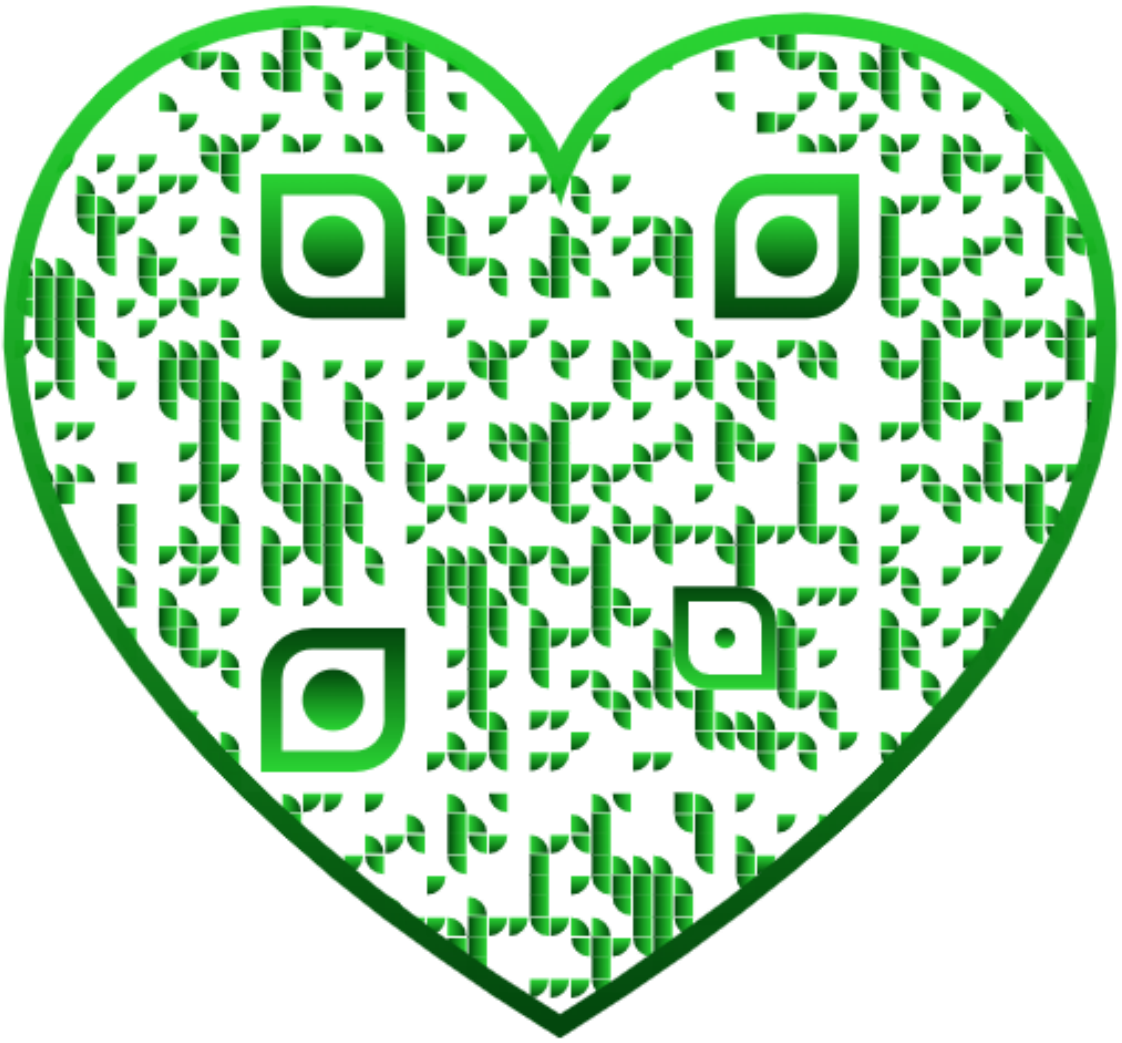
and
ANTIGRAVITY
Challenging the Challenges
Douglas Vandenberghe



ENGINEERING, SCIENCE

and

ANTIGRAVITY

Challenging the Challenges

Douglas Vandenberghe

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Preface

Electrical, mechanical and electromechanical devices and machines that are claimed to exhibit antigravity characteristics are presented. One such device, T.T. Brown's electrokinetic apparatus (US Patent No. 3 187 206), is modified and experimentally investigated. The experimental results combined with a critique of mainstream science form the basis for the development of generic energy models describing mass and charge, the electron and the proton. These models, which assume the existence of Zero Point Energy, offer some explanation for the properties inherent to mass and charge, science's basic mechanical and electrical laws, antigravity and many of the antigravity devices and machines that have been reported. Possible relationships that could exist between antigravity, gravity and unexplained geophysical phenomena are discussed. Suggestions for research that integrates antigravity with science in a mutually synergistic manner are shared.

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INTRODUCTION

Antigravity, the generation of a gravity-like field / force to counter the effects of gravity, has been an enduring subject of science fiction writers. However for many of us our first experiences with this phenomenon was a fairy tale that we gladly embraced, "The Night Before Christmas" penned by Clement C. Moore in 1822. The thought of gravity defying reindeer pulling a sled full of toys and St. Nicholas through the sky was just too much to resist, even when we were disillusioned with the truth. This fairy tale has been further popularized by a host of writers and vocal artists and we continue to support it to this very day.

Leaving the comfort of our imagination we find that levitation can be associated with almost all major world and shamanic religions. Reports of saints involuntarily levitating during religious raptures have been supported by an impressive number of eye witness testimonies. St. Teresa of Avila (1515-1582) was observed on many occasions, usually in deep prayer, rising anywhere from a few feet to as high as the ceiling of a room. St. Joseph of Cupretino (1603 –1663) has gone into history as “the flying saint”. Before the Court of the Inquisition in Naples he underwent three trials. But even in front of the Judges he went into ecstasy and rose from the ground. Not having the courage to condemn him they sent him to the Vatican Court in Rome. This time Joseph was questioned in the presence of Pope Urban VIII, and such was Joseph’s joy to find himself before the Vicar of Christ, he went into ecstasy and flew high over the heads of the Pope and the united Cardinals. On seeing this marvel with their own eyes they all became admirers of this humble little brother.

The list of people capable of levitation doesn’t end with the Roman Catholic Church. On June 6, 1936, Indian yogi Subbayah Pullavar levitated for four minutes in front of 150 witnesses. He was in a state of deep trance,

and once back on the ground, his limbs couldn't be unbent at first. In 1984 an African witch-doctor, Nana Owaka, in Togo levitated and was captured on film by a German film crew. After meditating a full day he placed dry leaves and twigs in a circle and sat in the middle. A villager then lit the circle of twigs as the sun was setting and the flames rose upwards. Drums began beating wildly and Owaka stood and rose straight upward and hung as if suspended for a full minute before falling back to earth.

Daniel Dunglas Home (1833–1886), a Scottish–American spiritualist, had a triumphant career as a medium. In his drawing room séances furniture moved for no apparent reason, ghostly hands appeared, and furniture and Home himself would levitate in the air. One of his most famous levitations occurred at a séance in front of three witnesses. Home was alleged to have levitated out of the third storey window of one room and return through the window of an adjoining room.

A grander example of levitation is evident in the accounts of Dr. Jarl, a Swede. While visiting a Tibetan monastery southwest of the capital, Lhasa, he was taken to a meadow facing a high cliff. About 250 metres up the face of the cliff was an entrance to a cave where monks were building a stone wall. Meanwhile, embedded in the ground 250 metres from the foot of the cliff, was a large rock slab with a bowl-shaped depression in it. A block of stone, 1.5 metres long, 1 metre wide and 1 metre high, was manhandled into the depression. Monks with 19 musical instruments, 13 drums and 6 very long trumpets, were arranged in an arc of about 90 degrees, 63 metres from the bowl-stone. The drums, open at one end, were aimed at the stone block. Behind each instrument was a line of monks eight to ten deep. A monk in the middle of the arc began chanting and beating out a rhythm on a small drum, and then, the other instruments joined in. After four minutes the large stone block began to wobble and float into the air, rocking from side to side. All the instruments were trained on the stone as it rose upwards at an accelerating rate until it finally crashed onto the ledge at the entrance to the cave. The monks continued to perform this feat at the rate of 5 or 6 stones per hour. Although levitation of the stone block appears to be some kind of

acoustic phenomenon, the role of the 200 or so monks behind the instruments suggest some form of psychokinesis may be involved. That is, the chanting with musical accompaniment could serve to coalesce and focus a trancelike meditative state within this large group to demonstrate that antigravity could go well beyond levitation of a single person or the movement of small objects. Dr. Jarl's account of the Tibetan monks raising large stone blocks 250 metres in the air is considered to be an accurate record of what he observed.

Many ancient megalithic structures around the world incorporate tight fitting stone blocks weighing at least 100 tons that were transported from quarries over 10 km away. Such structures would include

>> the pre-Incan fortresses at Ollantaytambo and Sacsayhuaman in the Peruvian Andes

>> the ruins of Tiahuanaco near Lake Titicaca in Bolivia

>> the Great Pyramids of Egypt

>> the Roman temple of Jupiter at Baalbek in Lebanon

Mainstream archaeologists reject the notion that an advanced civilization existed in the remote past but the sheer weight and size of these stone blocks have led several researchers to wonder whether these ancient builders had mastered some form of levitation or antigravity technology. Some even believe that this technology has been witnessed and passed down to us in the forms of legend, occult power (of the Gods), acoustic levitation and/or mind power.

In more recent times there have been reports of geographic locations where gravity is seemingly altered in some manner. The names given to these places often reflected the observed anomalies. That is, if the location can be associated with some topographical feature such as a hill names like Gravity Hill, Magnetic Hill or Mysterious Hill are not uncommon. If there is perceived to be a paranormal (spirit) dimension to the anomaly names like Ghost Hill or Spook Hill can be expected. The usual explanation for the observed anomaly at places like these is that it is an optical illusion but after visiting Magnetic Hill (Moncton, New Brunswick) and the Cosmos (Black Hills, South Dakota) I am not convinced.

Going back to the early 1800s in the foothills of Lutes Mountain, New Brunswick, there were stories about a road where a horse drawn wagon going uphill would run up onto the horses' heels. In 1933 similar stories of cars rolling uphill without power piqued the curiosity of three newspaper reporters from the Saint John Telegraph Journal. That August they travelled to Moncton and spent hours trying every hill that they came upon in hopes of unravelling this mystery. After five hours without success they stopped to stretch their legs on the way home and .... the car started to roll uphill without power. Using all the equipment that they had brought they spent hours investigating trying to discover the secret. During this time they noticed that the water on the side of the road was also running uphill and this caused them to rule out magnetism – even though the hill is called Magnetic Hill to this very day. They finally decided that it must be some sort of optical illusion but they didn't know how or why. In the early 1970s the amalgamation of several outlying areas saw Magnetic Hill officially become a city street and since then a theme park has been built around this popular tourist attraction. It should be noted that "Magnetic" or "Gravity" hills have not only been reported in Canada but also in Australia, the Dominican Republic, Great Britain, India, the Philippines, and the United States.

The Cosmos Mystery Area, located in the Black Hills of South Dakota, is another place where gravity seems to be altered. The Cosmos was

discovered in 1952 by two college boys looking for a place to build a summer cabin. When they entered the area they experienced a slight unbalancing effect which piqued their interest and they began to investigate this odd phenomenon. Soon after they decided that there was something here that would be of interest to the general public and began developing demonstrations of the phenomenon. Today there are several gravity defying demonstrations of balls that appear to be rolling uphill, people sitting on chairs or standing at seemingly impossible angles to vertical and a mass suspended from the ceiling of the "shack" that was harder to push in one direction than the other. Another of these demonstrations involved two concrete slabs approximately three quarters of a metre apart and at the same elevation (as verified by a carpenter's liquid level). Two volunteers are asked to stand facing each other, first on one slab and then the other. The change in their relative heights when they do so can readily be seen. As in the case of Magnetic Hill the Cosmos Mystery Area is a popular tourist attraction.

The most controversial of all antigravity phenomena are those suspected of being of extraterrestrial origin, Unidentified Flying Objects (UFOs). Near the end of World War II unidentified balls of light were being observed around both German and Allied planes and each thought that they were the enemy's. These UFOs became known as Foo Fighters. Shortly after the end of the war Kenneth A. Arnold (1915-1984) reported seeing nine unusual objects in formation over Mount Rainier, Washington, on June 24, 1947. His description of the craft " .... they resembled a flat saucer .... " was widely reported by the press as flying saucers. This term has received popular acceptance ever since.

Less than a month after Kenneth Arnold reported seeing flying saucers over Mount Rainier there was another UFO incident near Roswell, New Mexico. This incident is considered by many to involve a crashed UFO with extraterrestrial occupants. The United States military initially reported it as an UFO incident but shortly after changed their story to the recovery of a top secret research balloon. Controversy surrounding this incident prevails

to this very day. The Roswell Incident was pivotal in UFO history because government cover-up, military and otherwise, became a factor to consider in all UFO reports and investigations. Disinformation tactics to generate public confusion and disbelief regarding the UFO mystery ultimately had a negative effect on antigravity research.

Since the Roswell Incident hundreds of photographs, video tapes and personal accounts by responsible people (airplane pilots, police officers, ...) have been documented and organizations in both the government and public domains have investigated UFO incidents. The Mutual UFO Network (MUFON), an organization in the public domain, gathers information and documents UFO cases, provides UFO related information to the public and sometimes challenges the government / military on specific UFO incidents.

In summary, the scope of antigravity phenomena on a worldwide scale has been highlighted in accounts of human levitation, possible levitation of objects of substantial mass, gravity defying demonstrations and UFOs. However, before a definitive explanation of these phenomena is possible a more scientific approach needs to be developed. A study of the devices / machines that are claimed to generate gravity-like field / forces or antigravity is considered here to be the first step in this process.

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Antigravity Inventors and Researchers

Mechanical, electromechanical and electrical antigravity devices / machines have been constructed and these different types are described here. The claims made by their inventors are presented along with other phenomena that they have observed during the course of their investigations. Their work, in its entirety, represents an untapped knowledge base that we will ultimately reference and analyze to explain antigravity and the implications of this research to modern day science and technology.

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Nikola Tesla (1856-1943) was born a subject of the Austrian empire. He studied electrical engineering at the Austrian Polytechnic in Graz (1875) where he became interested in alternating electric current. In 1882 he moved to Paris to work as an engineer designing improvements to electrical equipment for the Continental Edison Company. Two years later he immigrated to the United States to work for Thomas Edison at the Edison Machine Works. He formed his own company, Tesla Electric Light and Manufacturing, in 1886 but was relieved of his duties by the company's investors because of his vision for an alternating current motor.

In 1887 he constructed a brushless alternating current induction motor. The next year he developed the principles for his Tesla coil and began working for the Westinghouse Electric and Manufacturing Company where his alternating current ideas were well received. His patents and theoretical work formed the basis of modern alternating current electric power systems.

In 1899 Tesla began conducting high voltage and high frequency experiments in his Colorado Springs, Colorado, laboratory. Within a year the results he obtained could be applied towards wireless communication or wireless power transmission. He went on to conduct more advanced high voltage and high frequency experiments in his new laboratory located at Shoreham, Long Island, New York. During his high voltage discharge experiments he experienced unexplained forces. These observations were the first documented account of a phenomenon that would later be referred to as electrogravitics. Paul La Violette describes Tesla's experiences in his book "Secrets of Antigravity Propulsion" as follows.

"A high voltage shock discharge produces a momentary gravitational thrust that we may refer to as the electrogravitics impulse effect. One example of this is the train of shock discharges that were emitted from Tesla's high-voltage magnifying transmitter (see figure 6.1). The shocks created thrusts in their direction of travel with minimal reversal occurring during their intervening relaxation periods. Tesla frequently remarked on the force that such impulses would exert on distant objects. He noted that when he stood near the source of the discharges, he could feel them as a great force or sharp pressure striking the whole front of his body. These effects were most apparent as a stinging of the face or hands, which persisted even when he situated himself behind glass and metal shields as far as 50 feet from the shock source. By properly adjusting the discharger on his transmitter, he was able to either project forces outward or direct forces inward."

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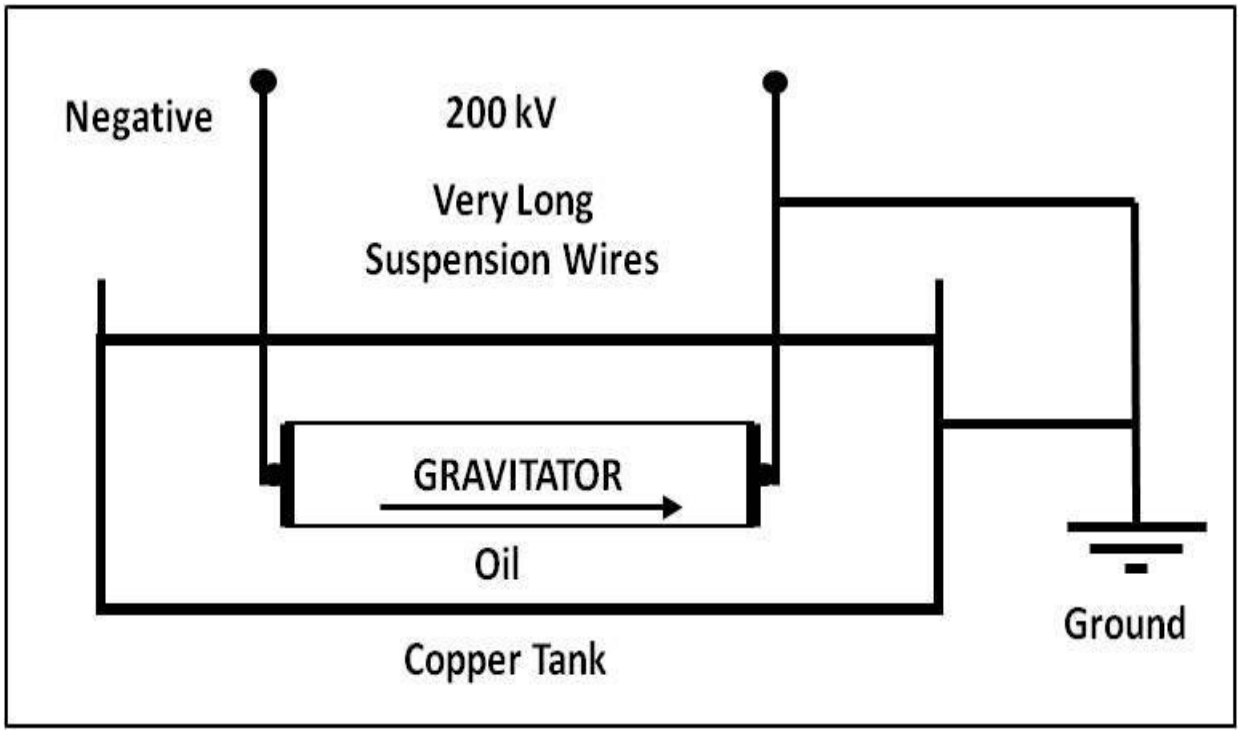
Thomas Townsend Brown (1905-1985) had a career that was entwined with the military and at times shrouded in secrecy. Brown was born into a well established and respected family in Zanesville, Ohio. Brown's discovery of the electrogravitics phenomenon occurred during his high school years while experimenting with a Coolidge tube – a high voltage X-ray emitting tube. He began personally funded research into what would eventually be termed electrogravitics at a private laboratory near his home in Zanesville and at Denison University with Dr. Paul Biefeld, Director of Swazey Observatory. In 1924 he demonstrated the relation between electricity and gravity using what he termed a gravitator. His apparatus consisted of two 44 pound lead balls separated by a glass rod (dielectric). The lead balls were suspended by wires 45 centimetres apart. The balls were given an opposite electrical charge in the range of 120,000 volts and their movement measured using sensitive optical methods. Brown found that a unidirectional impulse type force (generally in the line of the bodies) is generated that is directly proportional to the product of the masses and the applied charge and inversely proportional to the square of the distance between the balls.

Dr. Biefeld helped Brown refine his apparatus and methodology to the point where the gravitational variations produced by the moon and sun and much smaller variations produced by different planets could be observed.

In his paper "How I Control Gravitation", Science and Invention, August 1929, T.T. Brown describes the apparatus shown in the following illustration as a dielectric with two plates at either end suspended by wires in an oil bath. His test procedure involved applying a differential voltage across the gravitator's plates while in its rest (uncharged) position. The gravitator's initial swing, as indicated by the arrow, takes about 5 seconds. Then, with the voltage still applied, the gravitator gradually swings back to its rest (uncharged) position over the next 55 seconds. The cycle can be repeated after the gravitator is discharged for more than 5 minutes. Tests have shown that the amplitude of the impulse force generated when the gravitator is charged is dependent upon the applied voltage while its duration is governed

by external gravitational conditions. Gravitational fields parallel to the gravitator were found to have the greatest effect on its movement characteristics. Brown also found that reversing the polarity of the applied voltage does not change the direction, amplitude or duration of the impulse force.



The Gravitator

T.T. Brown undertook an exhaustive experimental investigation of his gravitator and found the following:

>> Any system of two bodies possesses a mutual and unidirectional force (typically in line with the bodies) that is directly proportional to the product of the masses, directly proportional to the potential difference and inversely proportional to the square of the distance between them.

>> The gravitational field of the Earth had no apparent influence on the experiment. The gravitational factors entered consideration through the mass of the electrified bodies.

>> Gravitational variations produced by the moon and sun were observed along with much smaller variations produced by different planets. These effects were most pronounced when the affecting body was in alignment with the differently charged elements and least pronounced when at right angles.

>> Applied voltage determines only the amplitude of the swing.

>> Applied amperage is only sufficient to overcome leakage around and through the dielectric at the required voltage. Thus the total load approximates 37 ten-millionths of an ampere. It apparently has no other relation to the movement at least from the present state of physics.

>> Mass of the dielectric is a factor in determining the total energy involved in the impulse. For any given amplitude an increase in mass is an increase in the energy exhibited by the system.

>> Duration of the impulse with electrical conditions maintained is independent of all of the foregoing factors. It is governed solely by external gravitational conditions, positions of the moon, sun, etc., and represents the total energy or summation of energy values which are effective at that instant.

>> Gravitational energy levels are observable as the pendulum returns from the maximum deflection to the zero point or vertical position. The pendulum hesitates in its return movement on definite levels or steps. The relative position and influence of these steps vary continuously every minute of the day. One step or energy value corresponds in effect to each cosmic body that is influencing the gravitator. By merely tracing a succession of values over a period of time a fairly intelligible record of the paths and the relative gravitational effects of the moon, sun, etc., may be obtained.

T.T. Brown patented his invention in Britain, British Patent No. 300 311, "A Method of and an Apparatus or Machine for Producing Force of Motion", November 15, 1928.

Brown joined the United States Navy on September 3, 1930, and after completing basic training, he was accorded the status of a junior physicist at the Naval Research Laboratory, Washington, DC. He was involved in a series of gravity, geophysical and electrogravitics related studies up to the start of World War II. Having achieved the rank of Lieutenant Commander his wartime duties included acoustic and magnetic mine sweeping (Officer in Charge, Bureau of Ships) and outfitting ships in the Philadelphia Navy Yard (Assistant Machinery Superintendant). While at the Philadelphia Navy Yard Brown is believed to have been involved with the Philadelphia Experiment, a highly classified experiment where a destroyer, the USS Eldridge DE173, was unofficially reported to have been rendered invisible by generating an intense magnetic field around it. This experiment is believed to have been conducted in October, 1943 and the results were disastrous for all concerned. Brown retired from the navy in December, 1943.

He became a radar consultant to the navy after he retired and worked temporarily at the Pearl Harbour Navy Yard. In 1945 he resumed his personal electrogravitics research (Pearl Harbour, Hawaii) and demonstrated his gravitator and tethered flying discs to Admiral Arthur W. Radford, Commander in Chief of the U.S. Pacific Fleet. Interest was shown but there was little support for his research. Seven years later and now living in Los Angeles, California he established the Townsend Brown Foundation. He assimilated his ideas and insights into a manned antigravity fighter, built in the shape of a disc. This initiative was named Project Winterhaven and was demonstrated to the U.S. military but never accepted. In 1955 as a research consultant for the French aerospace company Societe Nationale de Constructions Aeronautiques du Sud-Ouest he tested his discs in a vacuum with even more success than in air and dispelled the criticism that the phenomenon was the result of ion wind. From 1957 to 1959 he acted as an

antigravity research consultant for the Bahnson Company and General Electric. He went into semi-retirement in the mid 1960s and directed his attentions to drawing stored electrical energy from common rocks. In 1985 he died in relative obscurity.

Throughout his career Brown invented several high voltage devices while maintaining an active interest in antigravity (electrogravitics) propulsion systems for military aircraft. T.T. Brown's legacy includes the following patents.

UNITED STATES

>> Brown, T.T., "Electrostatic Motor", United States Patent No. 1 974 483, September 25, 1934.

>> Brown, T.T., "Electric Precipitation Method (Air Cleaner)", United States Patent No. 2 207 576, July 9, 1940.

>> Brown, T.T., "Vibration Damper", United States Patent No. 2 417 347, March 11, 1947.

>> Brown, T.T., "Electrokinetic Apparatus", United States Patent No. 2 949 550, August 16, 1960.

>> Brown, T.T., "Electrokinetic Transducer", United States Patent No. 3 018 394, January 23, 1962.

>> Brown, T.T., "Electrokinetic Generator", United States Patent No. 3 022 430, February 20, 1962.

>> Brown, T.T., "Electrokinetic Apparatus", United States Patent No. 3 187 206, June 1, 1965.

>> Brown, T.T., "Electric Generator", United States Patent No. 3 196 296, July 20, 1965.

>> Brown, T.T., "Electrohydrodynamic Fluid Pump", United States Patent No. 3 267 860, August 23, 1966.

>> Brown, T.T., "Method and Apparatus for Producing Ions & Aerosols", United States Patent No. 3 296 491, January 3, 1967.

>> Brown, T.T., "Fluid Flow Control System", United States Patent No. 3 518 462, June 30, 1970.

BRITAIN

>> Brown, T.T., "A Method of and an Apparatus or Machine for Producing Force of Motion", British Patent No. 300 311, November 15, 1928.

>> Brown, T.T., British Patent No. 1 274 875, May 21, 1969, (same as United States Patent No. 3 518 462).

FRANCE

>> Brown, T.T., French Patent No. 1 207 519, June 24, 1958, (same as United States Patent No. 3 187 206).

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Agnew H. Bahnson, Jr. was one of the many researchers that investigated the antigravity claims made by T.T. Brown. His "Electrical Thrust Producing Device" was basically a capacitor that incorporated a

rotating surface. Bahnson found that the device's propulsive force could be enhanced by the rotating surface and by complementing the high (dc) differential voltage with an alternating (ac) voltage. These devices are described in the following patents.

>> Bahnson, Agnew H. Jr., "Electrical Thrust Producing Device", United States Patent No. 2 958 790, November 1, 1960.

>> Bahnson, Agnew H. Jr., "Electrical Thrust Producing Device", United States Patent No. 3 223 038, December 14, 1965.

>> Bahnson, Agnew H. Jr., "Electrical Thrust Producing Device", United States Patent No. 3 227 901, January 4, 1966.

>> Bahnson, Agnew H. Jr., "Electrical Thrust Producing Device", United States Patent No. 3 263 102, July 26, 1966.

The significance of Bahnson's research is that it introduces further evidence that antigravity isn't just a static steady state or time invariant phenomenon involving a high voltage, but instead, a time invariant and time variant phenomenon that should be investigated from both a mechanical and electrical perspective until evidence indicates otherwise.

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Jean Louis Naudin, another researcher investigating the antigravity claims made by T.T. Brown, conducted experiments using a capacitor

strikingly similar to the one described by Brown in his United States Patent No. 3 187 206, June 1, 1965. The Brown-Bahnson Saucer levitated when a very high voltage was applied. Naudin describes in detail this and related experiments on his website (http://www.jlnlabs.org) and challenges all to improve upon his efforts. The challenge has been taken up by several researchers with at least one claiming that his device can lift a small payload.

This is one of the few cases where antigravity information is openly shared and encouraged - a welcome change from the norm.

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E.J. Saxl (1904-1981) was a well known physicist and inventor of quality instrumentation with Tensitron, Inc., a United States company he established and managed with his wife. One of his accomplishments was the refinement of a torque pendulum and measurement apparatus that could reliably determine the acceleration of gravity in one oscillation of the pendulum's disc. The apparatus consisted of a disc suspended from a small diameter wire within a metal housing that was electrically insulated from the supporting structure by a rubber pad. The pendulum and housing could be grounded or at a high positive or negative voltage. A typical operating or oscillation cycle would begin with de-energizing the disc's holding mechanism. A photoelectric cell senses the position of the pendulum and starts the pendulum's period timer. The disc rotates about 150 degrees and then returns to have its position sensed again. At this point the timer is stopped and the disc's holding mechanism re-energized. The pendulum disc is then held for a minute or two before

the cycle is repeated again. The acceleration of gravity is determined from the timer data.

After thousands of observations over a decade it was found that the pendulum's period of oscillation is sensitive to the voltage placed on the pendulum and its housing, electrical disturbances prior to and during earthquakes, volcanic eruptions and hurricanes, changes in the local gravitational field that could be attributed to natural causes (moon, sun, ...) and electrical activity in the environment (thunderstorms, ...). These observations remain unexplained.

Saxl's torque pendulum is described in his patent "Device and Method for Measuring Gravitational and Other Forces", United States Patent No. 3 357 253, December 1967. He also published a paper, "An Electrically Charged Torque Pendulum" in Nature, Vol. 203, No. 4941, pp 136-138, July 1964, documenting his findings.

It is interesting to note that the gravity related claims made by Saxl for his electric torque pendulum are suspiciously similar to those made by Brown for his gravitator. Saxl, however, pursued the development of a device that could rapidly and reliably measure the acceleration of earth's gravity whereas Brown directed his attention to the development of antigravity devices / machines. Regardless of the objectives one can postulate that the intense electrostatic fields generated by the high operating voltages are responsible for the generation of a gravity-like field which ultimately interacts with the mass of the device to give it its observed operating characteristics. In the case of the electric torque pendulum the force would alter the pendulum's rotational movement or period of oscillation and for the gravitator it would be the device's swing characteristics. This suggests that both devices could be generating a gravity-like field / force and because of this the electric torque pendulum has been included with the antigravity devices / machines presented here.

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J.R.R. Searl, the inventor of the levity disc, had little formal technical training. In 1949 while working as a technician for the Midlands Electricity Board he noticed that spinning metal parts produce a small electromagnetic force. He decided to design and construct what he thought would be an electric generator based on this principle and he completed construction of the first prototype in 1952. It was about three feet in diameter with a segmented disc rotor that passed through fields generated by electromagnets located around the rotor's outer periphery. The differential voltage generated by the spinning rotor energized the electromagnets to increase the generator's electrical output. A small engine was used to drive the generator.

On the first test the generator began to produce power at unexpectedly high voltages. Then, the generator lifted up breaking it's coupling with the engine and flew upwards out of sight never to be found. Searl, with the help of associates, constructed several more levity discs, some up to thirty feet in diameter. Unfortunately these were also lost in a similar manner during vehicular propulsion experiments and demonstrations.

The following phenomena were observed during the course of the levity disc experiments.

>> Antigravity or levity of the entire machine.

>> Electrostatic fields that were estimated to be in the 10**5 to 10**13 volt range.

>> Peculiar magnetic fields. The magnetic field from the generator produced induction in conductive loops when there was no relative movement.

>> Perpetual motion. After a threshold potential (of about 10**13 volts) is exceeded energy output exceeds energy input (by about 10**13 to 10**15 watts).

>> Loss of inertia. The generator and attached parts become inertia free after the threshold voltage (about 10**13 volts) is exceeded.

>> Flight control. By altering the distribution of potential on the surface of the craft it is possible to propel it in different directions.

>> Ionization of air. The high voltages being produced caused the surrounding air to be ionized.

>> Electric polarity. Searl felt a cobweb sensation on his skin after working near the levity disc and his clothes and bed linen clung to him.

>> Matter snatch. When the power is suddenly switched on, the craft takes a lump of the ground that it was resting on as it rises up.

These observations and test results remain unexplained, "Ether Technology: A Rational Approach to Gravity Control" by Rho Sigma, CSA Printing and Bindery, Lakemont, Georgia.

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Viktor Schauberger (1885-1958) was a natural scientist and inventor of environmental friendly technology. As a young man he worked as a "forest–master" in the Austrian Alps. His remarkable powers of observation led him to investigate and artificially copy the inward moving and twisting vortices that he saw in nature. Schauberger believed that when these vortex systems are co-ordinated and phased together huge forces and rays that he called "diamagnetism" are released. Diamagnetism is of immediate concern here because it could be interpreted as an antigravity field. One of his inventions, the "Repulsin", suggests just that.

The Repulsin takes in air at its top center and draws it into rotating waveform discs where it undergoes a series of contraction / expansion processes. At about 10,000 rpm a standing resonant shockwave is believed to form between the rotating waveform discs causing the air to become diamagnetic or generate an antigravity field. The air exhausts from the rotating waveform discs at the outer circumference of the Repulsin and then flows downward and inward to form an upward moving vortex in the centrally located pressure chambers within it. The lift force is believed to result from the differential pressure / vortex effect and the diamagnetic or antigravity field acting on the Repulsin. The Repulsin Type A was Schauberger's first design. It was destroyed when it broke its mooring and crashed into the ceiling during an unauthorized experiment.

Nick Cook, in his book "The Hunt for Zero Point", claims that an improved version of the Type A Repulsin, the Repulsin Type B, was constructed by Schauberger under orders (and threats) from Hitler's SS. The goal was to develop a new submarine propulsion system. Cook also claims that near the end of the war the Germans attempted to destroy all information and sources of information regarding this project. The Russian and American occupying forces took whatever was left, models, papers .... and the information that we have in the public domain today concerning these machines is what has been overlooked by the Russian and American occupying forces in Germany after

the Second World War. Callum Coates documents Schauberger's work in two of his books, "Living Energies" and "Energy Evolution".

Schauberger's legacy includes the following patents.

AUSTRIA:

>> Schauberger, Viktor, "Construction for Creating Wild Brooks and Flow Regulation", Austrian Patent No. 113 487, June 10, 1929.

>> Schauberger, Viktor, "Jet Turbine", Austrian Patent No. 117 749, May 10, 1930.

>> Schauberger, Viktor, "Artificial Channel for Transporting Logs", Austrian Patent No. 122 144, April 10, 1931.

>> Schauberger, Viktor, "Installation and Correction of Flow in Draining Channels by a Contention and Stabilization of Dammed Water" Austrian Patent No. 136 214, January 10, 1934.

>> Schauberger, Viktor, "Water Conduction", Austrian Patent No. 138 296, July 10, 1934.

>> Schauberger, Viktor, "Construction for Fabricating Tap Water like that of Natural Springs", Austrian Patent No. 142 032, June 11, 1935.

>> Schauberger, Viktor, "Air Turbine", Austrian Patent No. 145 141, April 10, 1936.

>> Schauberger, Viktor, "Plow", Austrian Patent No. 166 644, August 25, 1950.

>> Schauberger, Viktor, "Tubing for Flowing and Gaseous Media", Austrian Patent No. 196 680, March 25, 1958.

FRANCE:

>> Schauberger, Viktor, "Processes and Equipment for the Conveyance of Liquid, Gaseous or Aeriform Media Processes ...", French Patent No. 1 057 576, March 9, 1954.

UNITED STATES:

>> Schauberger, Viktor, "Method and Apparatus for Sorting Timber", United States Patent No. 1 775 871, September 16, 1936.

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Sandy Kidd, an ex-Royal Air Force radar technician, had removed a gyroscope from a Vulcan nuclear bomber and was carrying it behind him as he descended the aircraft's ladder. When his feet touched the ground he was flattened by a sledgehammer blow to his back. He attributed this to the still spinning gyroscope. Kidd's interest in gyroscopic devices to produce lift was stimulated and after many years working in his shop (garden shed) and at considerable personal expense he claimed he had achieved this. Sandy Kidd's antigravity machine, which is based on a mass rotating at high speeds, is described in his patent "Gyroscopic Apparatus", United States Patent No. 5,024,112. British Aerospace confirmed that the device did produce a small weight change but funding for the project was eventually dropped.

It should be noted that there are over thirty United States patents since 1975 claiming reactionless thrust forces for propulsion based on gyroscope devices. Since reactionless drive force claims are an apparent violation of Newton's Third Law, for every action there is an equal and opposite reaction, mainstream science takes a very dim view of these types of claims.

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H.J. Wallace was also able to create what he considered a gravity-like field / force based on the high speed rotation of a mass. The following are the patents describing his devices.

>> Wallace, H.J., "Method and Apparatus for Generating A Secondary Gravitational Force Field", United States Patent No. 3 626 605, December 1971.

>> Wallace, H.J., "Method and Apparatus for Generating A Dynamic Force Field", United States Patent No. 3 626 606, December 1971.

Wallace's devices are further evidence that the high speed rotation of a mass can generate a gravity-like field / force.

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Eric Roberts Laithwaite (1921-1997), a Professor of Electrical Engineering at Imperial College, England, is widely recognized for his development work related to the linear induction motor used in magnetic levitation (Maglev) propulsion systems. He also did a significant amount of groundbreaking work with gyroscopes and gave a demonstration at London's Imperial College of Science and Technology involving an 8 kg flywheel on a 2.7 kg support shaft. He could barely lift the device off the ground with his right arm, but when the flywheel was spinning and forced to precess, he was able to lift it effortlessly with his little finger by applying a force of less than 1 kg.

Precession is when one end of a rotating shaft is fixed and the other end bearing the rotating mass traces a circle as the shaft sweeps out a cone. Force precessed is when the device is forced to precess faster than normal. There is no accepted theory to explain why a force precessed gyroscope becomes lighter and produces a lifting force without any counterbalancing reaction force.

Laithwaite demonstrated this gyroscopic phenomenon in a lecture before the Royal Institution of Great Britain in 1974. It was not well received. For the first time in the Institution's 200 year history the proceedings of the lecture or annual evening discourse wasn't published and any chance Laithwaite had for a Royal Society fellowship evaporated. Undaunted he continued to experiment with a variety of complex gyroscopic rigs believing that he had discovered a brand-new thrustless propulsion system. After his retirement from Imperial College he continued his work at Sussex University with William Dawson, a fellow engineer and inventor. The fruits of their labour can be studied in a patent that they received two years after Laithwaite's death, Laithwaite, Eric and Dawson, William, "Propulsion System", United States Patent No. 5 860 317, January, 1999.

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John Hutchison, in 1979, accidentally discovered what he termed the Hutchison Effect during his attempts to study Nikola Tesla's longitudinal waves. The Hutchison Effect is a collection of unexplained phenomena that occurs as a result of radio wave interference in a zone of spatial volume encompassed by high voltage sources, usually Van de Graff generators and two or more Tesla coils. The radio wave interferences producing the Effect can be from as many as four and five different radio sources, all operating at low power. However, the zone in which the interferences take place is stressed by hundreds of kilovolts.

The Hutchison Effect:

>> The levitation of heavy objects has been witnessed many times by numerous credentialed scientists and engineers and is well documented on both film and videotape. The question that remains isn't if it occurs but how. Hutchison's apparatus requires 75 Watts of power from a 120 volt AC outlet to levitate a 60-pound cannon ball.

>> The fusion of dissimilar materials indicates that the Hutchison Effect has a powerful influence on Van der Waals forces. In a striking and baffling contradiction, dissimilar substances can simply "come together" without the individual substances dissociating. That is, a block of wood can simply "sink into" a metal bar without the metal bar or the block of wood coming apart. There is no evidence of displacement as would occur if one were to sink a stone into a bowl of water.

>> The anomalous heating of metal without any evidence of burning or scorching of the adjacent materials (usually wood) is a possible indication that the nature of heat may not be completely understood. This has far-reaching implications for thermodynamics, which hinges entirely on the presumption of such knowledge.

>> The spontaneous fracturing of metals is unique. There is no evidence of an "external force" causing the fracturing and the separation involves a sliding motion in a horizontal sideways direction.

>> The changes in crystalline structure and physical properties of metals are reminiscent of the "spoon bending" of Uri Geller, except that there is no one near the metal samples when the changes take place. A metal bar can be as hard as steel at one end and soft as powdered lead at the other end. This again suggests that the Van der Waals forces are being influenced in some manner.

Some researchers suspect that Hutchison has tapped into the Zero Point Energy. This energy gets its name from the fact that it is evidenced by oscillations at zero degrees Kelvin, where supposedly all activity in an atom ceases.

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The Challenges

The mechanical, hydraulic, electromechanical and electrical antigravity devices / machines that have been presented here highlight the wide range of possibilities associated with generating an antigravity force. No real explanation as to why this occurs has been offered by any of the researchers. For more information regarding a particular device / machine, the books, papers and patents cited are suggested references. The following presents antigravity research from a historical perspective.

1920s

>> Thomas Townsend Brown invents the Gravitator.

1930s

>> Thomas Townsend Brown joins the United States Navy and continues his research at the Naval Research Laboratory, Washington DC.

1940s

>> Viktor Schauberger, the Austrian water wizard, builds the Repulsin, a flying saucer shaped device that is claimed to have antigravity characteristics.

>> Nazi Germany is conducting top secret antigravity research in Europe.

>> Evidence suggests that the United States and Russian military captured top secret antigravity research documents and equipment at the close of World War II.

1950s

>> The term electrogravitics is coined to mean the science and technology associated with electrostatic energy being used to generate a gravity-like field / force for vehicle propulsion.

>> Several large aviation corporations are actively pursuing antigravity (electrogravitics) research but by the end of the decade all activity stops.

>> John R.R. Searl invents the levity disc, an electric generator that develops extremely high voltages and exhibits antigravity characteristics.

>> Antigravity is linked to paranormal phenomena, Unidentified Flying Objects (UFOs).

1960s

>> Antigravity (electrogravitics) researchers continue their investigations.

>> The stigma associated with linking electrogravitics to paranormal UFO phenomena discourages antigravity research.

>> The United States military expresses limited interest in antigravity even though outer space is fast becoming an issue of national importance.

1970s

>> H.W. Wallace obtains a United States patent for a spinning mass device that he claims can generate a secondary gravitational force field.

>> Eric Roberts Laithwaite, developer of the linear induction motor, demonstrates the gyroscope weight loss phenomenon at his Friday night discourse to the Royal Institute of Great Britain.

1980s

>> The need for advanced vehicle propulsion systems for space exploration rejuvenates interest in antigravity (electrogravitics).

>> John Hutchison explores and demonstrates the Hutchison Effect which includes such anomalies as antigravity, fusion and spurious heating of materials.

>> Rapid advancements in computer / communications technology renew public interest in antigravity (electrogravitics) at the national and international levels.

1990s to the Present

>> The National Aeronautics and Space Administration (NASA) supports the Breakthrough Physics Propulsion project (1996-2002). The topics of interest include experiments and theories regarding the coupling of gravity and electromagnetism, the quantum vacuum, hyper fast travel and super luminal quantum effects. Unfortunately NASA's primary focus remains on rocket based propulsion systems which in effect guarantees a short range earth based space exploration program for the foreseeable future.

>> The United States military is suspected of having developed antigravity (electrogravitics) propulsion systems. Nick Cook's book "The Hunt for Zero Point" describes the long involvement of governments and the military in antigravity and related research activities.

>> Paul A. LaViolette's book "Secrets of Antigravity Propulsion" focuses on classified aerospace technology and states that the United States Patent and Trademark Office's guidelines require patent examiners to flag and reject any application that violates the "known laws of physics"... particularly perpetual motion machines, antigravity devices / machines, room temperature superconductivity devices, free energy devices / machines and faster than the speed of light devices.

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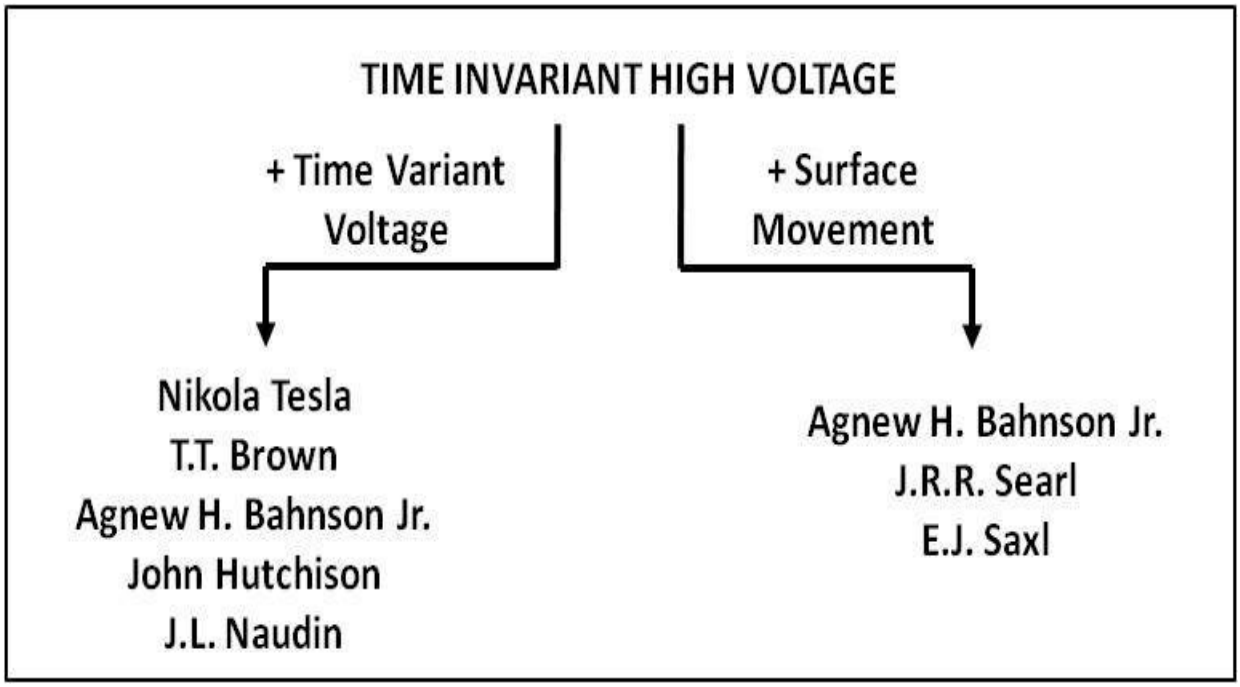
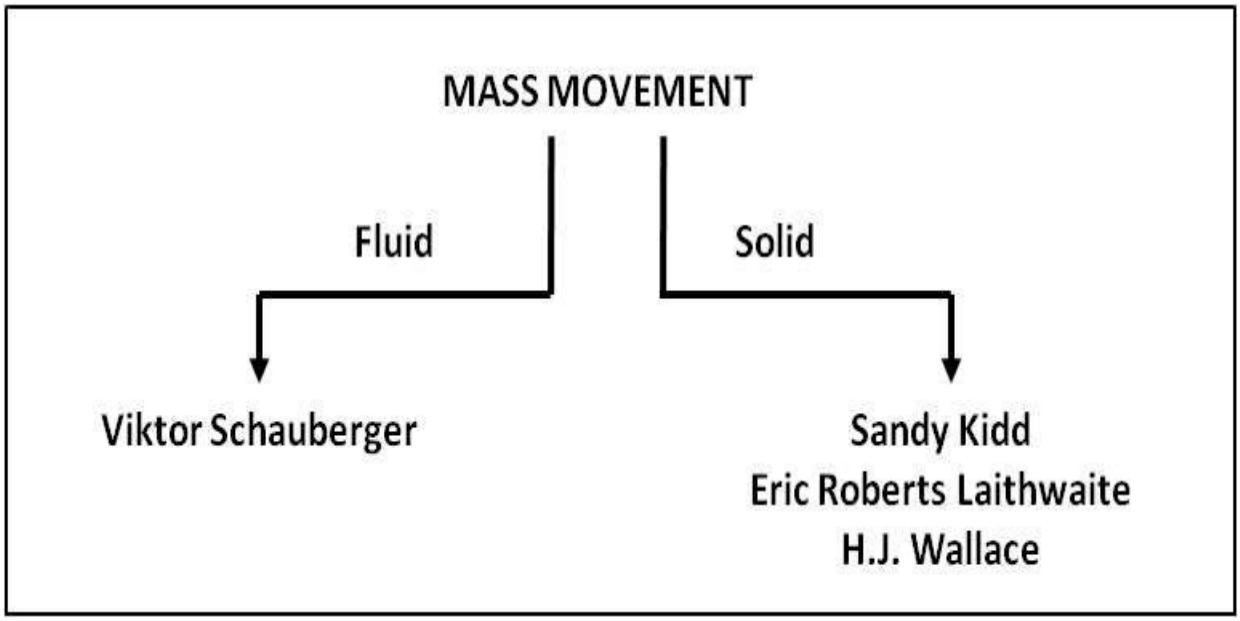
The motivation for engineers, inventors and scientists pursuing antigravity research and the development of antigravity devices / machines is a combination of economic gain, personal recognition and acceptance, both social and professional. Obviously public disclosure is mandatory for meeting these goals. Mainstream science's response to antigravity discourages research associated with this phenomenon and if one persists in pursuing this avenue of research his / her personal and professional credibility and career could be at risk. In addition to that in some countries there seems to be little benefit to applying for patent protection since it will only be rejected or worse yet one could be divulging valuable information needlessly. These are the more important non-technical challenges associated with antigravity research.

The technological and scientific challenges arising from our inability to explain the different antigravity devices / machines and their operating characteristics are summarized in the following illustrations. The generation of a gravity-like field / force could involve high voltages or high voltages and time variant voltages or electric and electromagnetic field interactions or movement of highly charged surfaces or combinations of these. In addition to this the movement of mass, either liquid of solid, can also generate a gravity-like field / force.



Antigravity Devices / Machines – Electrical



Antigravity Devices / Machines – Mass Movement

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ANTIGRAVITY AND MAINSTREAM SCIENCE

The different antigravity devices / machines that have been developed by researchers have shown beyond reasonable doubt that something is amiss. The following is a brief history of mainstream science's mass and electrical laws that are expected to be associated with antigravity and their viability (not veracity) with respect to explaining the antigravity phenomenon is assessed.

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Present day science was born with Nicolaus Copernicus (1473-1543). Copernicus theorized that the sun was at the center of the universe with the planets revolving around it and the moon revolving around the earth. Johannes Kepler (1571-1630) organized the astronomical observations made by Tycho Brahe (1546-1601) and obtained what are now known as Kepler's Laws.

>> The planets orbit the sun in elliptical paths with the sun at one focus of the ellipse.

>> The areas described by a straight line joining the center of the planet and the center of the sun are equal for equal orbital time intervals.

>> The ratio of the cube of a planet's mean distance from the sun to the square of its orbital period is the same for all planets in our solar system.

Kepler had proved that the circular planetary orbits predicted by Copernican theory were in fact elliptical.

Galileo Galilei (1564-1642), a physicist and astronomer, discovered the parabolic path of projectiles, studied the motion of pendulums and discovered that all objects fall toward the earth with the same acceleration, regardless of their weight, size or shape when gravity is the only force acting on them. His fame, however, rests with his astronomical observations using a telescope that he developed from a spyglass, an invention from Holland. His observations supported the Copernican theory but the church had already censored Copernican books by edict and was openly hostile to Galileo's findings and views. Galileo's accomplishments were many but his most valuable contribution to science was his founding of physics on precise measurement rather than metaphysical principles and formal logic.

Starting with Galileo's and Kepler's work, Isaac Newton (1642-1727), one of the greatest scientists in history, developed the mathematics of calculus and established the scientific principles governing the movement of an object.

Newton's Laws of Motion

First Law of Motion:

An object continues in a state of rest or in a state of motion at a constant speed along a straight line, unless compelled to change that state by a net force.

Second Law of Motion:

When a net force, F , acts on an object of mass, m , the acceleration, a , that results is directly proportional to the net force and has a magnitude that is inversely proportional to the mass.

a = F / m

Third Law of Motion:

Whenever one body exerts a force on a second body, the second body exerts an oppositely directed force of equal magnitude on the first body.

In addition to the Laws of Motion governing the movement of objects, Sir Isaac Newton made another major contribution to physics.

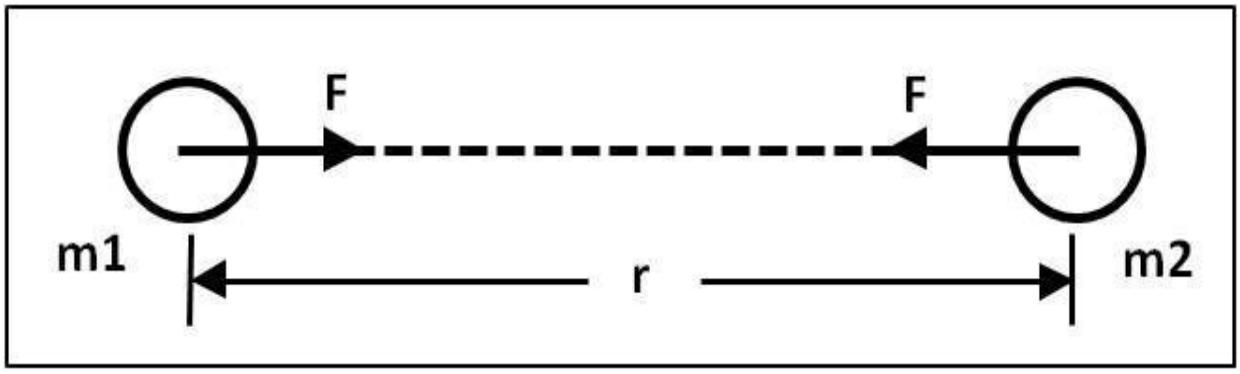
Newton's Law of Universal Gravitation

Every particle in the universe exerts an attractive force on every other particle. A particle is a piece of matter, small enough in size to be regarded as a mathematical point. For two particles, which have masses, m1 and m2 , and are separated by a distance, r , the force, F , that each exerts on the other is directed along the line joining the particles.

The magnitude of the gravitational force is

F = G m1 m2 / r2**

where G is referred to as the universal gravitational constant and must be determined experimentally.



Over one hundred years after Newton stated his Law of Universal Gravitation Henry Cavendish (1731-1810), a physicist and chemist, experimentally determined the value of the Universal Gravitational Constant as (6.754 x 10**-11) N (m**2) / (kg**2). This value is within one percent of that currently accepted. Newton's Law of Universal Gravitation, which suggests that gravity is a field / force phenomenon, could now be used.

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The early history of chemistry was veiled in the superstitions and mysteries of alchemy and charlatans. Alchemists boiled, brewed, burned, combined and tested well into the eighteenth century as they pursued their goals of transmuting base metals such as iron and lead into gold, curing disease and lengthening life indefinitely. In spite of its rather dubious reputation alchemy did leave a legacy of information for chemistry to refine and develop into a science. The early pioneers of chemistry include such great names as Joseph Priestly (1733-1804) who isolated oxygen for the first time and Henry Cavendish, who in addition to being the first to experimentally determine the Universal Gravitational Constant, was also the first to isolate hydrogen.

Antoine Lavoisier (1743-1794) stated the “nothing is lost, nothing created” Conservation of Matter Law and John Dalton (1766-1844) laid the foundation for chemistry when he proposed his theories concerning the nature and behaviour of matter. The key points associated with Dalton’s concept of matter are as follows.

>> All substances are composed of small, solid, indestructible particles called atoms.

>> The atoms of a given substance are identical as regards weight, size and shape.

>> The atom is the smallest part of an element that enters into a chemical change.

>> The molecules of a compound are produced by the union of the atoms of two or more elements.

>> The most stable compounds are formed when one atom of each of two elements combine.

A host of new elements were found when the spectroscope was adapted to chemical analysis work. Dmitry Mendeleyev (1834-1907) arranged the elements by weight and developed the forerunner of what is now the Periodic Table. Using this method of organization he began to predict with reasonable accuracy the existence of yet unfound elements and their properties. The science of chemistry was advancing to our present day interpretation of the atom.

The discovery of radium by Marie (1867-1934) and Pierre (1859-1906) Curie established that chemical elements could in fact transmute or change to other elements by natural radioactive decay. Their discovery irreversibly entwined the sciences of chemistry and physics at the atomic level.

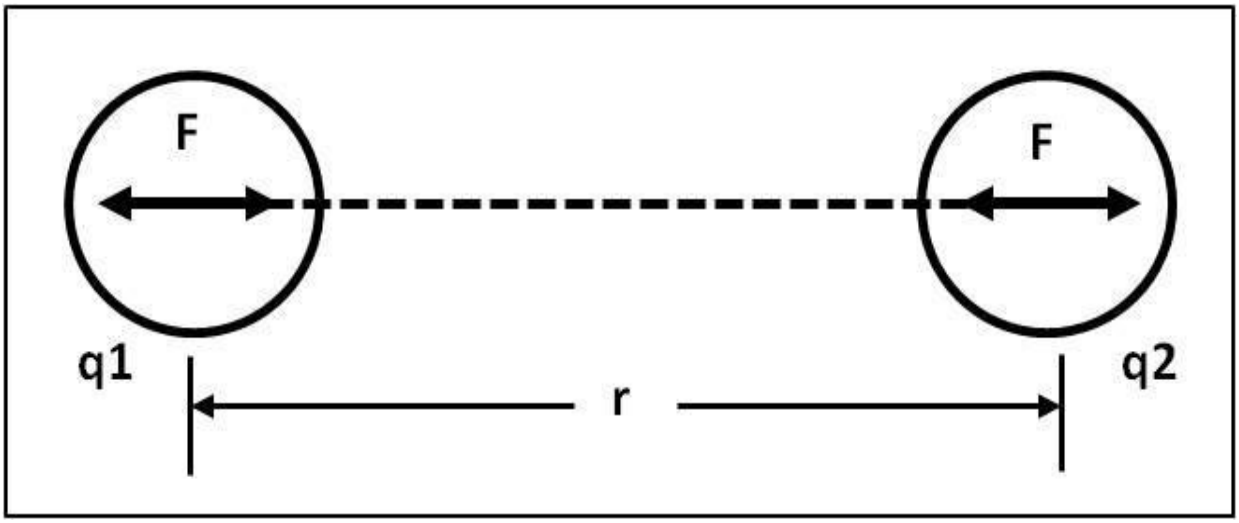
At the end of the eighteenth century the French physicist Charles-Augustin Coulomb (1736-1806) was pioneering electricity and discovered the relationship between electrostatic force and charge.

Coulomb's Law

The magnitude of the electrostatic force, F , exerted by one point charge on another point charge is directly proportional to their magnitude, q1 and q2 , respectively, and inversely proportional to the square of the distance, r , between the charges.

F = k q1 q2 / r2**

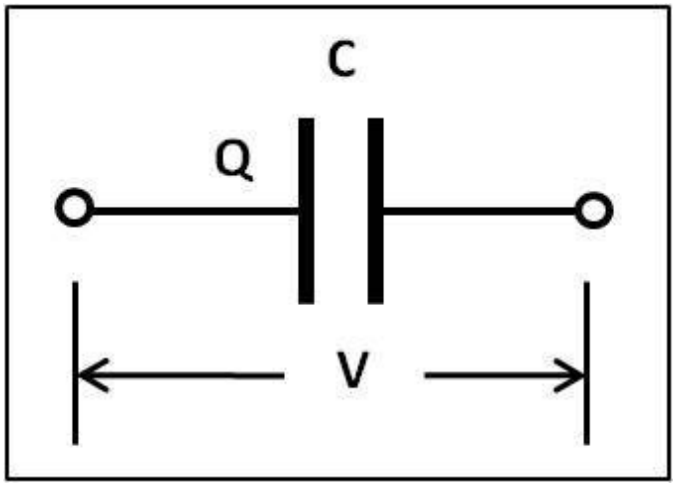
where k is the proportionality constant. The electrostatic force is directed along the line joining the charges, and it is attractive if the charges have unlike signs and repulsive if the charges have like signs.



Coulomb's work became the basis for defining the relationship between charge and differential voltage across the plates of a capacitor. That is, the magnitude of the charge on each plate, Q , is directly proportional to the magnitude of the potential difference, V , across the plates

$$\mathbf{Q = C\ V}$$

where C is capacitance, the proportionality constant.



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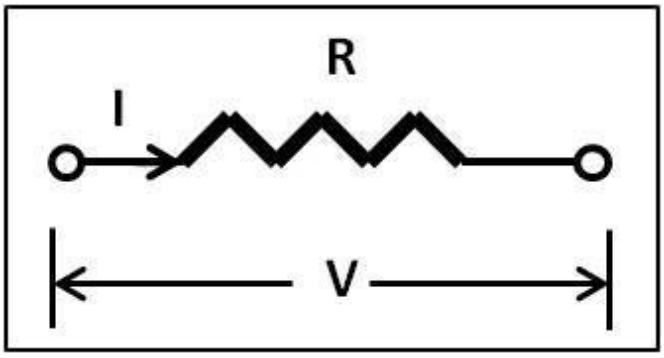
Georg Simon Ohm (1789-1854) discovered the relationship between differential voltage across a material, the flow of charge or electric current through a material and the resistance of the material to electric current.

Ohm's Law

The ratio of voltage, V , applied across a material and current, I , flowing through a material is a constant equal to the resistance of the material, R .

R = V / I



The concept of electrical energy being dissipated by the movement of charge, like heat resulting from the friction between two moving parts in a mechanical system, was now established in science.

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Early mariners used magnetic materials such as lodestone to take advantage of the earth's naturally occurring magnetic field for navigation purposes.

Studies that formally defined magnetism, electromagnetism and electromagnetic induction didn't begin in earnest until the nineteenth century. Hans Christian Orsted (1777-1851), a Danish physicist and chemist, discovered the phenomenon of electromagnetism. Michael Faraday (1791-1867), an English physicist and chemist, made notable contributions to the field of chemistry but is best known for his work in physics, electromagnetism.

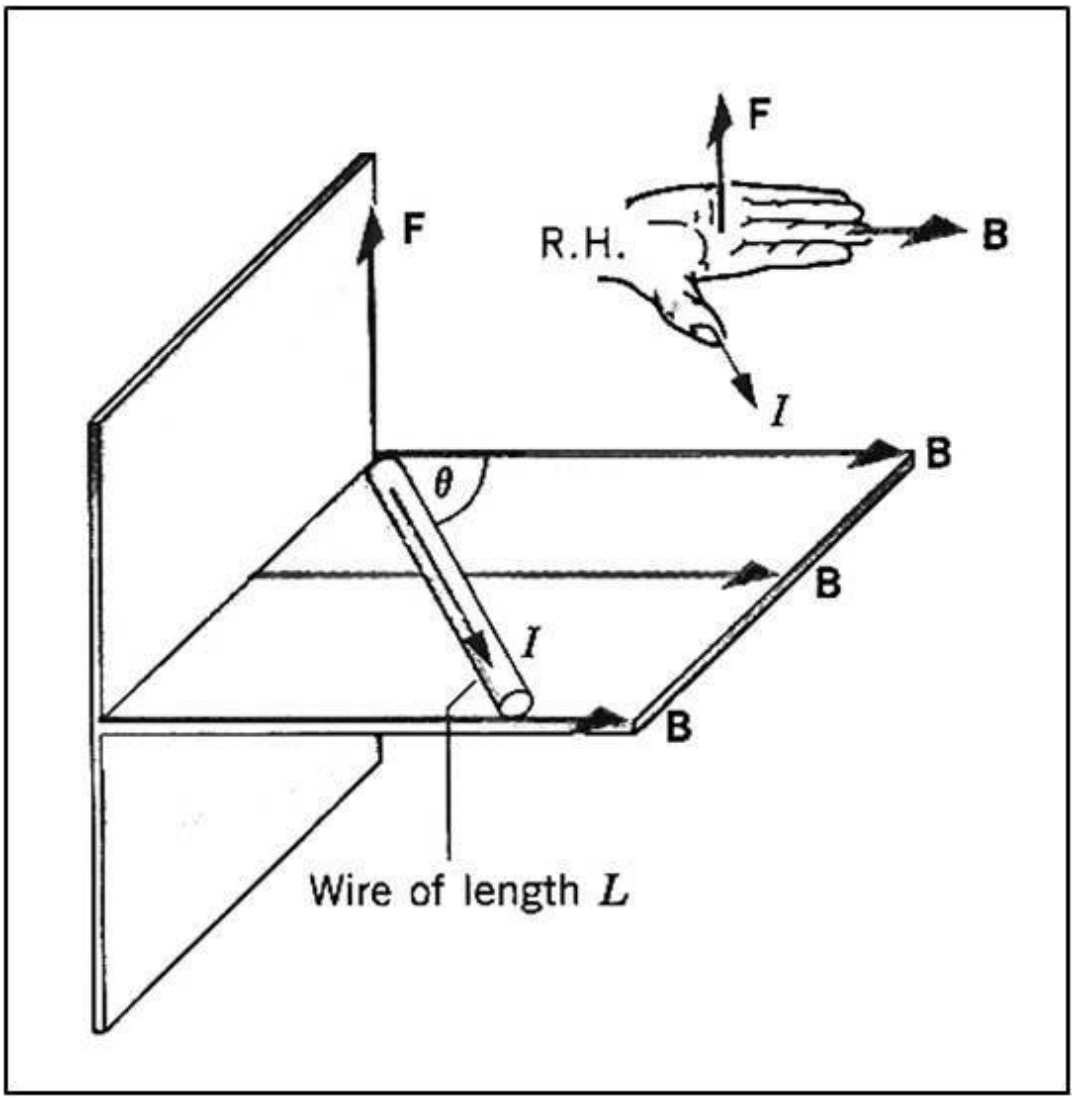
Faraday discovered that whenever there is a change in the electromagnetic flux, (delta phi) / (delta time), through a loop of wire of N turns there is a voltage, v , induced in that loop. This discovery is now known as

Faraday's Law of Electromagnetic Induction

$$v = - N \frac{\Delta \phi}{\Delta t}$$

Faraday's Law of Electromagnetic Induction is the basic principle of operation for electrical transformers, self and mutual inductors and some electric motors.

Faraday, who was an experimentalist, not a mathematician, established the concept of lines of force emanating from charged bodies and magnets. This visual interpretation of electric and electromagnetic fields greatly facilitated subsequent development of electrical devices / machines. An example of this is illustrated in the following sketch.



As shown a wire of length, L , is carrying a current, I , in a magnetic field, B , and a force, F , is being generated. The direction of the force can be determined from the direction the palm of the right hand is facing when the thumb is pointed in the direction of the current and the fingers in the direction of the magnetic field. The magnitude of the force is determined by the relationship

F = B L I sin(theta)

where (theta) is the angle between the wire and the magnetic field. If the wire is perpendicular to the magnetic field, (theta) = 90 degrees, the force acting on the wire is at a maximum

$$\mathbf{F = B\ L\ I}$$

and zero when (theta) = 0 degrees.

A host of observations, experiments and equations related to electricity, magnetism and light gradually evolved while Faraday was doing his ground breaking research. James Clerk Maxwell (1831-1879), a Scottish theoretical physicist and mathematician, integrated this confusing array of information into a consistent theory. His equations, commonly referred to as the Maxwell equations, showed that electricity, magnetism and even light are manifestations of the same phenomenon, electromagnetism. Maxwell's equations are actually a set of four partial differential equations that relate electric and magnetic fields to their sources. These equations can be combined to show that light is an electromagnetic wave.

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The twentieth century heralded nuclear physics as the emerging science of the day. The German physicist Max Planck (1858-1947) took the first step toward understanding wave-particle duality when he modeled black body radiation curves by assuming that they could be represented by a large

number of atomic oscillators, each having a discrete energy. In 1905 Albert Einstein (1879-1955) presented his photoelectric theory as a large collection of discrete packets of energy, E , with a magnitude equal to the product of Planck's Constant and the frequency of light. This work contributed significantly to his being awarded the Nobel Prize in 1921 even though he is more widely known for his Relativity Theories.

Einstein's Theory of Special Relativity, published in 1905, is based on two fundamental assumptions or postulates.

>> The laws of physics are the same in every inertial reference frame.

>> The speed of light in a vacuum, measured in any inertial reference frame, always has the same value no matter how fast the source of light and the observer are moving relative to each other.

Theory of Special Relativity

The equivalence of mass and energy is

E = m c2**

The mass of the object and its energy equivalent are denoted as m and E, respectively, and c is the speed of light.

The relationship between mass and velocity is

$$m = mo / [1 – (v / c)^2]^{1/2}$$

where m is the mass of an object at velocity, v , and mo is the mass of the same object at rest. You will note that mass goes to infinity when its velocity approaches the speed of light, c.

The time dilation relationship

$$(\Delta t) = (\Delta to) / [1 – (v/c)^2]^{1/2}$$

relates the passage of time measured by two observers, one stationary and one moving relative to the stationary observer at a velocity, v. The proper time interval between two events is the time interval measured by the moving observer, (delta to) . The time interval between the same two events measured by the stationary observer is (delta t) . The speed of light is denoted as c.

Length contraction

$$L = Lo [1 – (v/c)^2]^{1/2}$$

occurs when the length or distance between two points traveling together in the direction of velocity, v , changes. Lo is the distance measured between the two points by the stationary observer and L is the distance between the same two points measured by the moving observer. The relative velocity between the two observers is denoted as v and the speed of light is c.

Special relativity has had a profound effect on our perception and interpretation of the universe in which we live (Feynman, Richard P., “Six Not-So-Easy Pieces Einstein’s Relativity, Symmetry and Space-Time”, Perseus Books, Massachusetts, 1997). By 1915 Einstein had reconciled gravitational force with the requirements of special relativity to obtain his Theory of General Relativity. Einstein’s Theory of General Relativity, which assumes that gravitational effects move at the speed of light, can be summarized in two statements.

>> The geometry of space-time changes when matter is present. The curvature of space-time, defined in terms of the excess radius of a sphere, is proportional to the mass inside the sphere.

>> Objects respond to gravitational force such that their proper time of travel between two end conditions is a maximum.

It should be noted that Einstein’s Theory of General Relativity differs from Newton’s Law of Universal Gravitation in that it describes gravity as a curvature of space-time instead of a field / force generation process dependent upon the distance between two masses. Also,the Theory of General Relativity involves complicated mathematics to predict gravitational effects that are only marginally more accurate than Newton’s Law of Universal Gravitation and because of this Newton’s Law of Universal Gravitation is commonly used to predict gravitational forces, even within NASA’s space program.

While the theories of special and general relativity were being addressed Ernest Rutherford (1871-1937) developed our present day understanding of the atom. The Danish physicist Niels Bohr (1885-1962) defined the first realistic model of the hydrogen atom and led the way to a better understanding of atomic structure. Louis de Broglie (1892-1987) refined Bohr’s model of the atom by noting the wave-like characteristics of mass at the atomic level and Erwin Schrodinger (1887-1961) developed a wave

equation to describe the wave properties of a particle, the electron in the hydrogen atom. Subsequent work led to the development of present day quantum mechanics. The main difference between quantum mechanics and classical (Newtonian) mechanics is that the former deals with particles and the latter deals with large groups of particles.

Quantum mechanics accurately describes atoms and molecules at the atomic level as well as electrons, protons, photons, quarks, leptons, ... at the subatomic level. There are many mathematically equivalent formulations of quantum mechanics but the most commonly used is the transformation theory proposed by the theoretical physicist Paul Dirac (1902-1984). Quantum mechanics addresses the wave and particle-like behaviour, or wave–particle duality, of these entities in terms of a mathematical formulation that quantizes (n = 1, 2, 3, ...) measurable properties such as energy, position, momentum and angular momentum using probability distributions. As one would expect from such an input, a quantum mechanics analysis yields probabilistic results.

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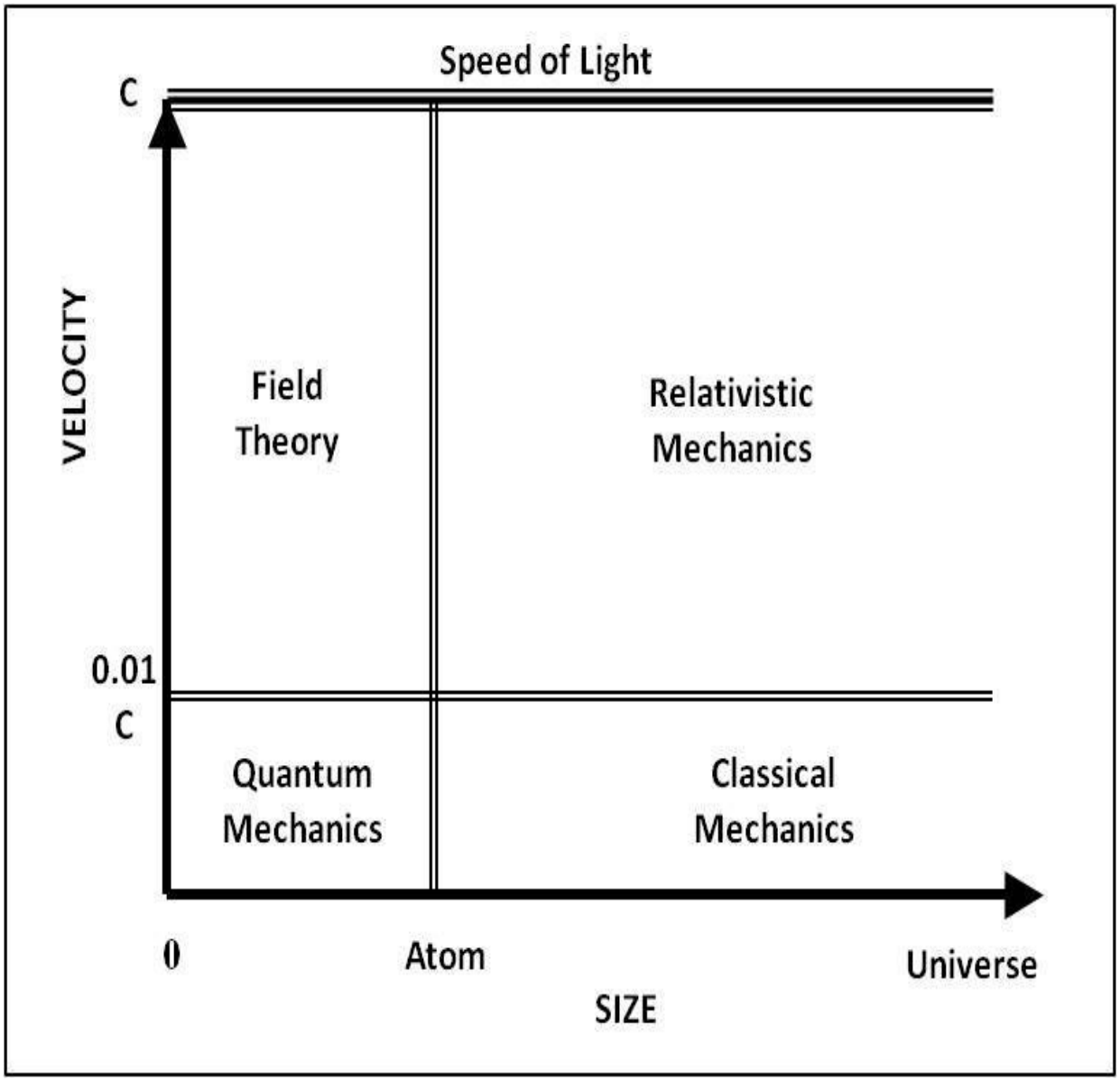
Science has made great strides towards understanding the universe around us over the past 300 years. The analysis techniques that physics has developed to realize these accomplishments can be categorized in terms of particle size and speed as shown in the following illustration. Relativistic mechanics (Albert Einstein) applies when particles are bigger than an atom and travel at a speed in excess of one hundredth the speed of light. Field theory (James Clark Maxwell) is used to analyze particles traveling faster than one hundredth the speed of light and smaller than an atom. For speeds less than

one hundredth the speed of light quantum mechanics is used to analyze atoms and particles smaller than an atom and for particles and objects greater than an atom the analysis is based on classical mechanics (Isaac Newton). Finally, relativistic mechanics places an upper limit on the speed that any particle can travel. That is, Einstein's Theory of Special Relativity states that when the particle's velocity, v , reaches the speed of light, c , mass, m , becomes infinitely large and therefore impossible to accelerate beyond the speed of light. The speed of light has been fixed by international agreement at 299,792,458 metres per second.



Modern Day Science

The mass and charge laws and relationships that are considered to be related to antigravity are as follows.

Electrical

Coulomb's Law: F = k q1 q2 / r**2

Faraday et al: F = B L I

Mass

Newton's Second Law of Motion: F = m a

Einstein's Special Theory of Relativity: E = m c**2

Einstein's Special Theory of Relativity: m = mo / [1 – (v / c)**2]**1/2

Newton's Law of Universal Gravitation: F = G m1 m2 / r**2

The shortcomings associated with these laws and relationships as they relate to antigravity are many.

>> Mainstream science's basic mass and electrical laws relate to either mass or electricity, not both, and as such are of questionable value when attempting to explain antigravity which involves both mass and electricity.

>> Mainstream science defines mass as energy (E = m c**2), a magnitude without any configuration. The latter, configuration, is considered essential

to the understanding of gravity, inertia, the increase of mass with velocity, charge and antigravity.

>> How mass energy integrates into a physical structure that has electrical characteristics, the electron and proton, remains a mystery.

>> Gravity, a naturally occurring phenomenon, is still being debated as to whether it is a space-time or a field / force generation process. Antigravity, a manmade phenomenon with characteistics similar to gravity, appears to be a field / force generation process.

>> Electric and electromagnetic fields are defined in terms of their force generation characteristics, not their physical construct and the transmission / interaction process that ultimately yields force.

Although antigravity and gravity appear to be of a similar nature, they represent a very different research challenge. Investigations to date have shown that the antigravity phenomenon could involve mass movement, time variant voltages, time invariant voltages and the geometry and materials of construction of the device / machine itself. Mainstream science's relationships and laws, simply can't explain this. However, they do accurately describe several isolated situations that may facilitate the development of an explanation for antigravity.

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EXPERIMENTAL INVESTIGATIONS

In the mid 1970s Atomic Energy of Canada Ltd. (AECL), a Canadian crown corporation with a mandate to develop the peaceful uses of atomic energy was soliciting ideas for a major new research and development initiative. As an AECL research and development engineer at the time I was beginning to get the uneasy feeling that nuclear energy's bright future was beginning to dim and creative ideas were needed to rejuvenate and strengthen the original mandate before the momentum derived from the nuclear program was lost. I decided to direct my attentions to defining a research and development program that would broaden the scientific and technological scope of the corporation's mandate. I had a lot of personal enthusiasm but no real direction. I agonized over the problem with a heightening appreciation of its magnitude. Finally, while watching a news clip of a space launch I realized that gravity could very well be the focus of my intentions. Nuclear scientists would obviously be involved, and from an engineering perspective, vehicle propulsion was an application begging to be addressed.

I reviewed the history of science and its accomplishments in search of answers to the questions that I had about gravity without any success other than reconfirming that gravity, the most ubiquitous phenomenon of all, was still the Holy Grail of scientific research. When I asked my colleagues, scientists and engineers, I quickly learned that the mere idea of something hovering in space or being propelled by an invisible and little understood force conjures up a host of conflicting physical, metaphysical, paranormal and even religious interpretations. Many of these discussions engendered comments of Unidentified Flying Objects (UFOs) with little green men hovering in space. Knowing that I was seriously trying to address the question of a new direction for research and development within the company the ridicule and jokes didn't cause me serious embarrassment or

harm other than to my pride. However it did teach me to use caution when dealing with this subject.

In 1978 I joined the University of Regina, Systems Engineering, where I met a researcher interested in antigravity. During our conversations he suggested that I familiarize myself with the research of Thomas Townsend Brown and electrogravitics. I was taken aback but my background in research, including gravity, had already taught me

Don't ignore the seemingly impossible. Explore it.

Keep an open mind to new ideas.

Reserve judgment until you have a rational basis for judging.

Based on my previous experience with gravity I strongly suspected that any investigation related to a device or technology involving the generation of a gravity-like field / force would be susceptible to irrational human behaviour. A research management strategy that constructively integrated the technological and scientific challenges with the social, professional, and human behavioural issues associated with antigravity would have to be adopted, if for nothing else, to protect the personal and professional credibility of myself and others involved. The following strategy was developed and adhered to throughout all of my antigravity research investigations.

>> Maintain a low research profile to minimize the negative impact of ridicule and criticism until the issues can be studied and some credible response prepared for reasoned discussion.

>> Give preference to those who are capable of interacting and addressing complex multidisciplinary technical issues with an appreciation of human behaviour.

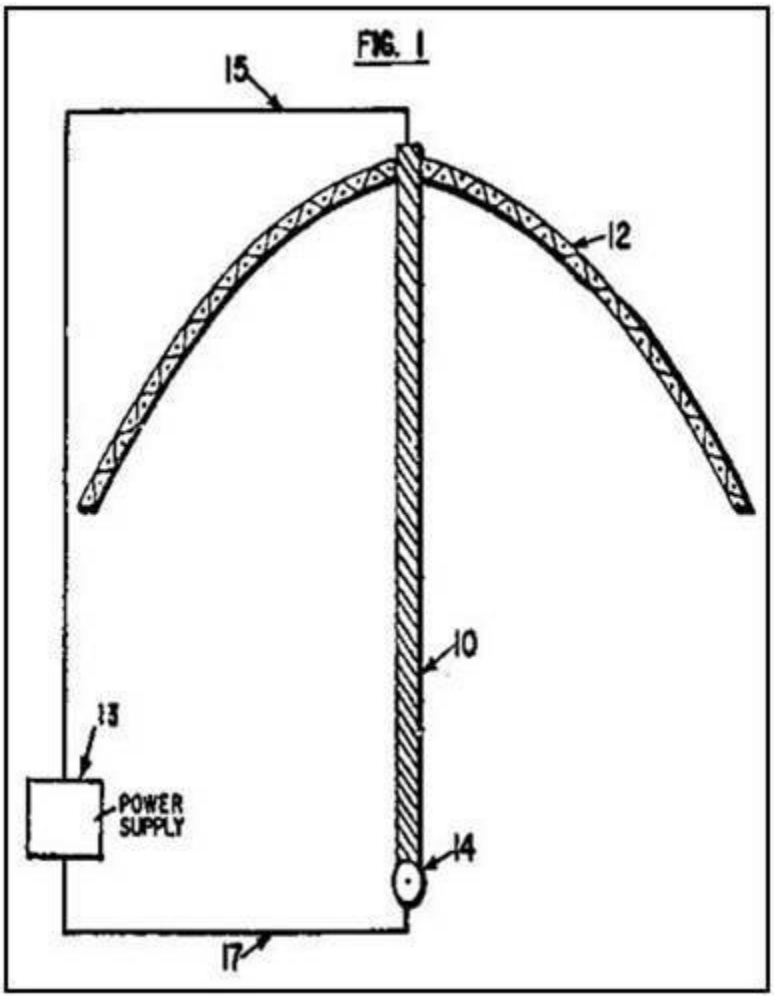
>> Promote human behavioural characteristics that support serendipity with the full understanding that a more rigorous and disciplined engineering or scientific methodology will be adopted at first opportunity.

>> Stress the highest standards of professional and ethical conduct.

>> Continuously monitor the working environment to ensure that the aforementioned elements of this strategy are met.

This research management strategy, which has served me well over the years, was formulated and adopted long before the United States Patent and Trademark Office (USPTO) directors reminded the patent examiners of the Sensitive Application Warning System (SAWS) program and what was expected of them - reject any application that violates the “known laws of physics”, and that includes antigravity devices / machines.

Generally speaking antigravity researchers / inventors tend to be secretive for a variety of economic, social, professional and personal reasons. However, patents do offer them some protection for their accomplishments as well as a forum for possible economic gain. The patent of immediate interest to these investigations was T.T. Brown’s Electrokinetic Apparatus, United States Patent No. 3 187 206, June 1965.



The Electrokinetic Apparatus

(United States Patent No. 3 187 206)

T.T. Brown's Electrokinetic Apparatus consists of two electrodes (12 and 14) connected together by means of an insulating rod or member (10). The large electrode can be flat or arcuate (parabolic, hyperbolic, hemispherical, ...) and the insulating material can be composed of more than one material and tapered. Electrical leads (15 and 17) connect the electrodes to the high voltage power supply (13). When a high differential voltage is applied across the electrodes a thrust force with the following characteristics is generated.

>> The direction of the force is from the high to low flux density regions and independent of the polarity of the voltage applied to the electrodes.

>> The magnitude of the force may vary slightly with the polarity of the voltage applied to the electrodes.

>> The magnitude of the force increases with the differential (dc) voltage applied across the electrodes and the rate at which the differential voltage is applied.

>> The magnitude of the force varies with the shape and location of the electrodes and dielectric member.

>> The magnitude of the force varies with the density and / or electrical properties of the dielectric member as well as the gradient of these material properties within the dielectric member.

>> The magnitude of the force varies with the surrounding dielectric medium.

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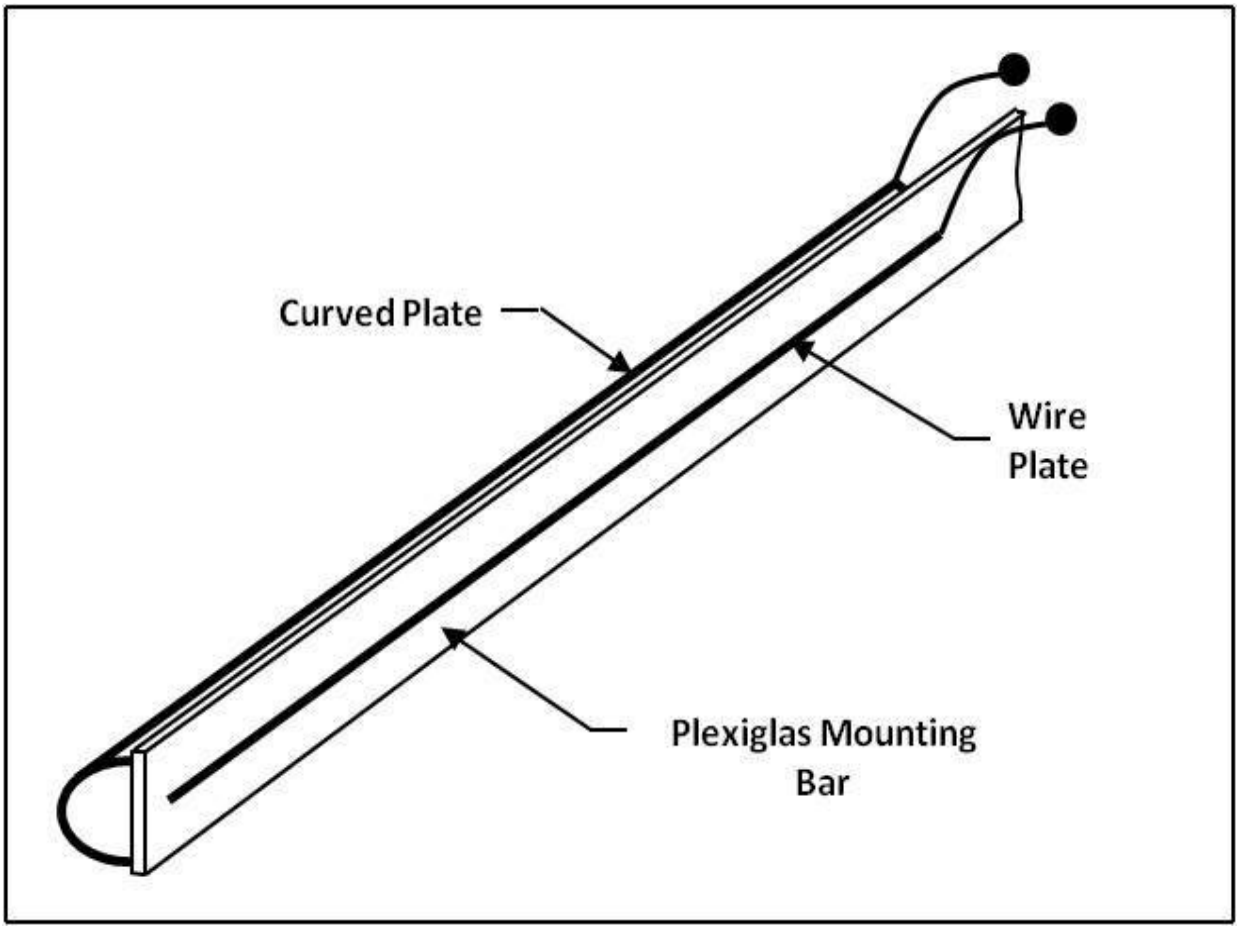
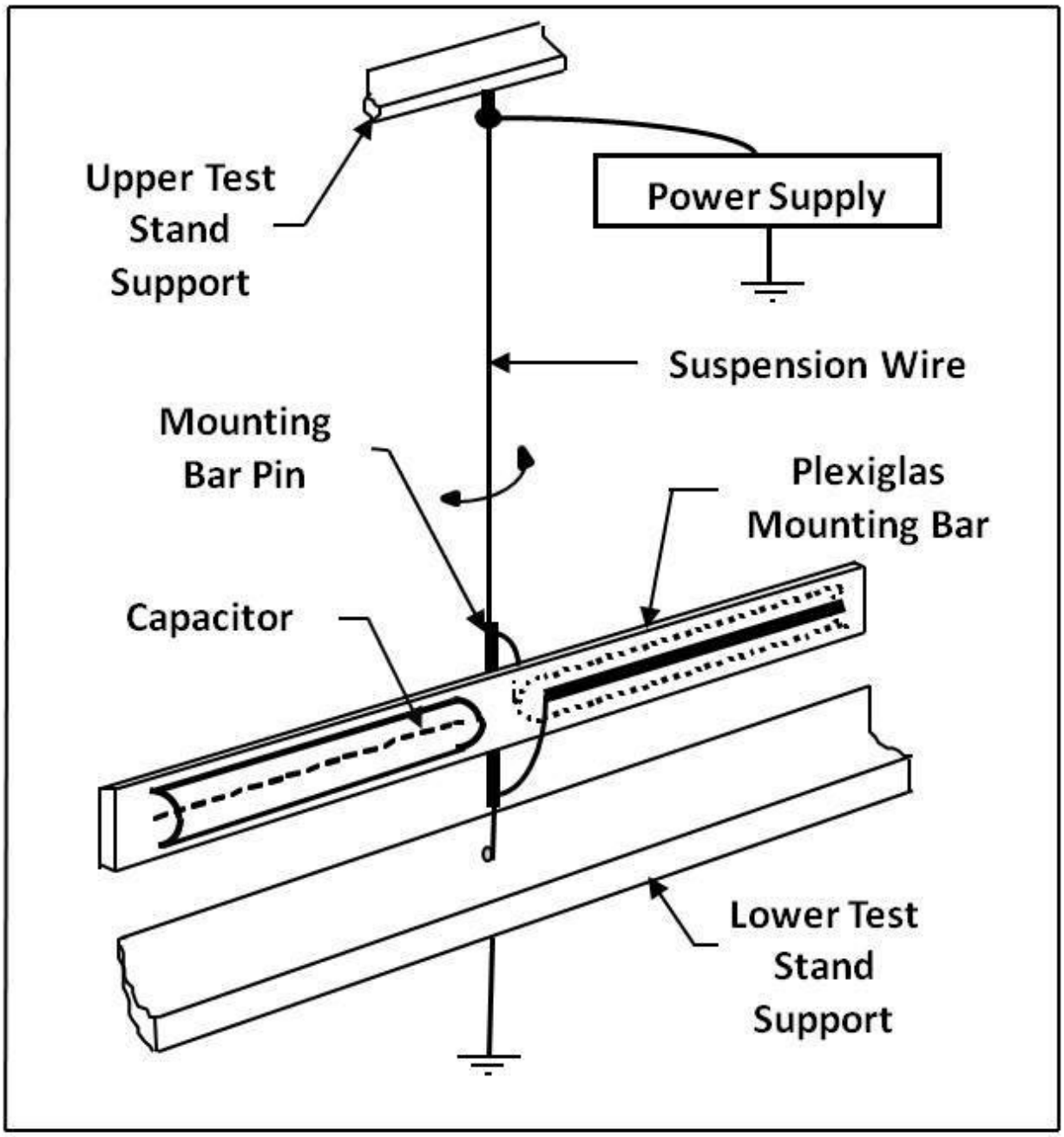
The Axial Convergent Capacitor

At a meeting with the researcher who originally suggested that I study T.T. Brown's antigravity (electrogravitics) research and an undergraduate student who would be involved with the high voltage experiments, the initial design of the axial convergent capacitor was developed. As shown in the following illustration the capacitor consists of a wire plate and curved plate mounted on a Plexiglas bar. The plates are 15 cm long and 1.5 cm apart and the geometry of the curved plate causes the electric field to be focused on the wire plate over its full length. The curved plate is made of copper and the wire plate a copper wire with a thin layer of plastic insulation to avoid inadvertent sparking during the high voltage experiments.



Axial Convergent Capacitor – Initial Design

A schematic of the test stand used to investigate the operating characteristics of the axial convergent capacitor is shown below. An axial convergent capacitor is located at either end of a Plexiglas mounting bar that is suspended from the mounting bar pin by means of a 30 gauge copper suspension wire. The wire is affixed to the upper test stand support and connected to a power supply. A 30 gauge ground wire is connected to the bar's lower mounting bar pin. The capacitors' curved and wire plates are electrically connected to the mounting bar pins as required for a test.

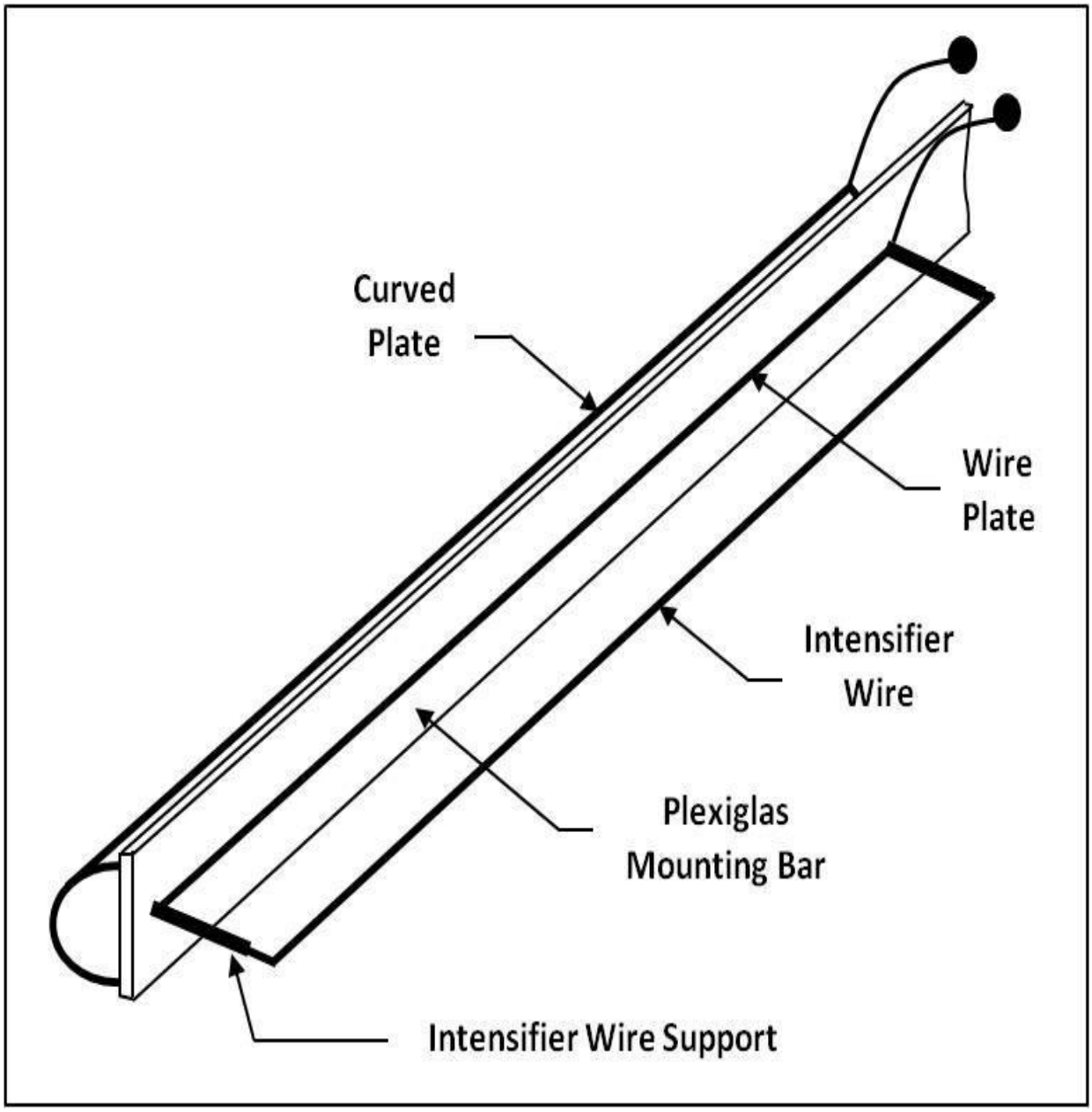


Axial Convergent Capacitor Test Stand

The first experiments consisted of applying a nominal differential voltage of 10,000 volts across one of the axial convergent capacitors mounted on the

Plexiglas bar. When the voltage was applied to the capacitor it was found that the bar rotated in one direction and then went backwards before stopping near its uncharged rest position. This suggested that the axial convergent capacitor was indeed generating a small force or torque on the bar but the angular displacements were usually less than 90 degrees and considered inconclusive for this study.

Subsequent experiments showed that if a wire, termed the intensifier wire, was looped around the wire plate as illustrated in the following diagram the movement characteristics of the bar, or force generating characteristics of the capacitor, were greatly improved. The Plexiglas bar typically rotated six to nine complete revolutions and its inertia caused it to slightly overshoot its final rest position. The rate of rotation was greatest when the voltage was first applied. This new capacitor design represented a major improvement to the axial convergent capacitor's force generation characteristics and was adopted for these experimental investigations.



The Axial Convergent Capacitor

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High Voltage Experiments

A series of exploratory high voltage experiments were conducted. One of the most spectacular experiments involved applying a nominal 10,000 volt differential voltage across both of the capacitors that were mounted on the Plexiglas bar. The bar started to rotate a little faster than normal. The suspension wire wound up and the bar's plane of rotation began to change from horizontal. After more than 75 revolutions the suspension wire twisted off and the mounting bar with the capacitors fell to the tabletop. The apparatus was repaired and the experiment repeated four more times with the same results. In one instance the Plexiglas bar's plane of rotation was about 30 degrees to the horizontal and on a collision course with the stand's lower (wood) test stand support. The collision never occurred. As an axial convergent capacitor approached the wooden test stand support it and the Plexiglas bar it was mounted on lifted up and traveled over the support without touching it. After passing the lower test stand support the bar came back down and continued to rotate at a 30 degree angle to horizontal. This continued until the suspension wire twisted off and the Plexiglas mounting bar with the capacitors mounted on it fell to the tabletop. During the course of these experiments the test apparatus sustained an increasing amount of damage from falling to the table top and finally it was necessary to terminate the tests for more extensive repairs. After the repairs were made it was found that the force generation characteristics of the capacitors had returned to normal. That is, when a nominal differential voltage of 10,000 volts was applied the bar rotated about six to nine revolutions before coming to rest.

The effects of voltage and geometry on the axial convergent capacitor's force generation characteristics were investigated. It was found that higher (dc) voltages enhanced the force generation characteristics of the capacitor and the magnitude of this force was only slightly greater when the curved plate was grounded and the wire plate negatively charged. The direction of

the force was usually from the wire plate to the curved plate and independent of voltage polarity. However, altering the capacitor's geometry, particularly the location of the intensifier wire, could change both the magnitude and direction of the force. No explanation could be found for the direction of the force being independent of voltage polarity or why the intensifier wire had such a dominating effect on the force generation characteristics of the axial convergent capacitor.

The intensifier wire, which was mounted on Styrofoam supports at either end of the capacitor, was a major source of interest throughout these experimental investigations. This 30 gauge copper wire was kept as taut as possible by taping it to its supports but the smallest force could displace it from its set position. During the experiments the intensifier wire usually bowed away from the capacitor plates. This was an observation that was so expected and routine that it was simply accepted until the following incident.

The laboratory had been locked overnight and the equipment shutdown with the intensifier wire straight and taut for next day's tests. In the morning it was noticed that the intensifier wire was bowed. The discussion following this observation brought to attention that this wasn't the first time that this had happened. This meant that something other than the application of a high differential voltage across the capacitor was generating a force on the intensifier wire. Several possibilities, including electromagnetic pickup from the lights and other equipment in the laboratory and building, were suspect but nothing was resolved.

Movement or bowing of the intensifier wire when a differential voltage was applied to the axial convergent capacitor was a standard occurrence and it was decided to mount the wire in a more substantial manner for better experimental control. The Styrofoam supports at either end of the capacitor were replaced by steel pins so that the intensifier wire could be tightened

and held firmly in place. After installing the pins and winding the intensifier wire around them it was found that the wire didn't move and neither did the bar when the nominal differential voltage of 10,000 volts was applied. In frustration the pins were removed, one by one, and the effect on bar movement noted. The bar showed some signs of movement when the first pin was removed and after removing the last one the bar's movement characteristics returned to normal. No reason could be found for this peculiar behaviour.

The scope of these high voltage exploratory investigations was extended to include time variant differential voltages. It was found that the bar's movement characteristics could be enhanced by controlling the intensity and frequency of electrical sparking across the capacitor's plates. This raised the very real possibility that the force generation characteristics of an axial convergent capacitor could be dependent on both time invariant (dc) and time variant voltages. A new dimension to these exploratory investigations had come to the forefront. Using an oscilloscope and high voltage probe the differential voltage across the 10,000 volt power supply was monitored. Under no load conditions the voltage output from the power supply consisted of a time invariant (dc) and a time variant voltage. Also, the power supply's output voltage was found to vary significantly with load current. These voltage characteristics served to deepen suspicions that the axial convergent capacitor's force generation characteristics were not just the result of a time invariant (dc) voltage but both a time invariant (dc) and a time variant voltage.

The electromagnetic field surrounding the axial convergent capacitor was usually sinusoidal in nature because of the variation in the power supply's output voltage but at times a fixed frequency pulse train was superimposed on this sinusoidal waveform. The frequency of the electromagnetic pulse train was typically in the 2,000 to 5,000 Hertz range. In a few experiments the basic sinusoidal waveform inexplicably changed to a square wave with pulses superimposed on it. It was also noted that the axial convergent capacitor's force generating characteristics were enhanced whenever

electromagnetic pulsing was present. Further investigations showed that the electromagnetic pulsing would stop when a small electric current flowed through the wire plate at ground potential.

A low voltage (10 volt) function generator was connected across the axial convergent capacitor and the effect of square, triangular and sinusoidal waveforms were investigated over a wide range of frequencies. In all cases the bar did show signs of movement with the square and triangular waveforms giving the best results. A preliminary frequency response experiment was conducted. The function generator, which now replaced the high voltage power supply, generated a 10 volt sinusoidal voltage across the axial convergent capacitor's plates. Subtle movements of the bar occurred intermittently and a discontinuity in the experimental results was observed in the 2000 to 5000 Hertz frequency range, the frequencies at which electromagnetic pulsing had occurred during the high voltage experiments. The results of this preliminary frequency response experiment indicated the need for a more exhaustive frequency response analysis of the capacitor's operating characteristics.

Following the low voltage function generator experiments the axial convergent capacitor's lightly insulated wire plate was replaced with a well insulated high voltage wire and the curved plate slightly modified to accommodate the attendant change in geometry. The resultant drive force generated by the capacitor when connected to the high voltage power supply wasn't as repeatable as before. For this convergent capacitor the Plexiglas bar would typically rotate about one turn when the voltage was applied, but sometimes, there was no movement of the bar at all. It was eventually learned that if a 110 volt / 60 Hertz voltage is connected across the capacitor for 10 to 20 seconds its force generation characteristics would return to normal. The technique of applying a 110 volt / 60 Hertz voltage to the axial convergent capacitor before connecting it to the high voltage power supply was investigated further. It was found that by simply de-energizing and then re-energizing the capacitor its force generation characteristics could be altered or even destroyed. However, they could

always be restored by applying a 110 volt / 60 Hertz voltage for a short period of time. No explanation could be found for these highly unusual operating characteristics.

The following is a summary of the results obtained from the high voltage investigations with the axial convergent capacitor.

>> The axial convergent capacitor generates a gravity-like drive force when charged to a high differential voltage.

>> The capacitor's geometry and materials of construction affect the magnitude of the force being generated.

>> The intensifier wire has a significant effect on the capacitor's force generating characteristics.

>> The direction of the gravity-like force is from the wire plate (high intensity electric field) to the larger curved plate (low intensity electric field) and unaffected by the polarity of the input voltage.

>> The magnitude of the gravity-like force is slightly greater when the wire plate is negatively charged.

>> The capacitor's force generating characteristics can be destroyed by a discharge / charge cycle but restored by applying a low frequency (ac) voltage across the capacitor's plates.

>> Large variations in the input voltage can increase the magnitude of the gravity-like force being generated by the axial convergent capacitor.

>> Electrical sparking at a specific frequency and intensity across the capacitor's plates can enhance the force generation characteristics of the capacitor.

>> A low voltage time variant (ac) input can cause the capacitor to generate a weak force.

These experiments were exploratory in nature and intended to define areas of importance for future research. As can be deduced from these results there is no shortage of issues to investigate.

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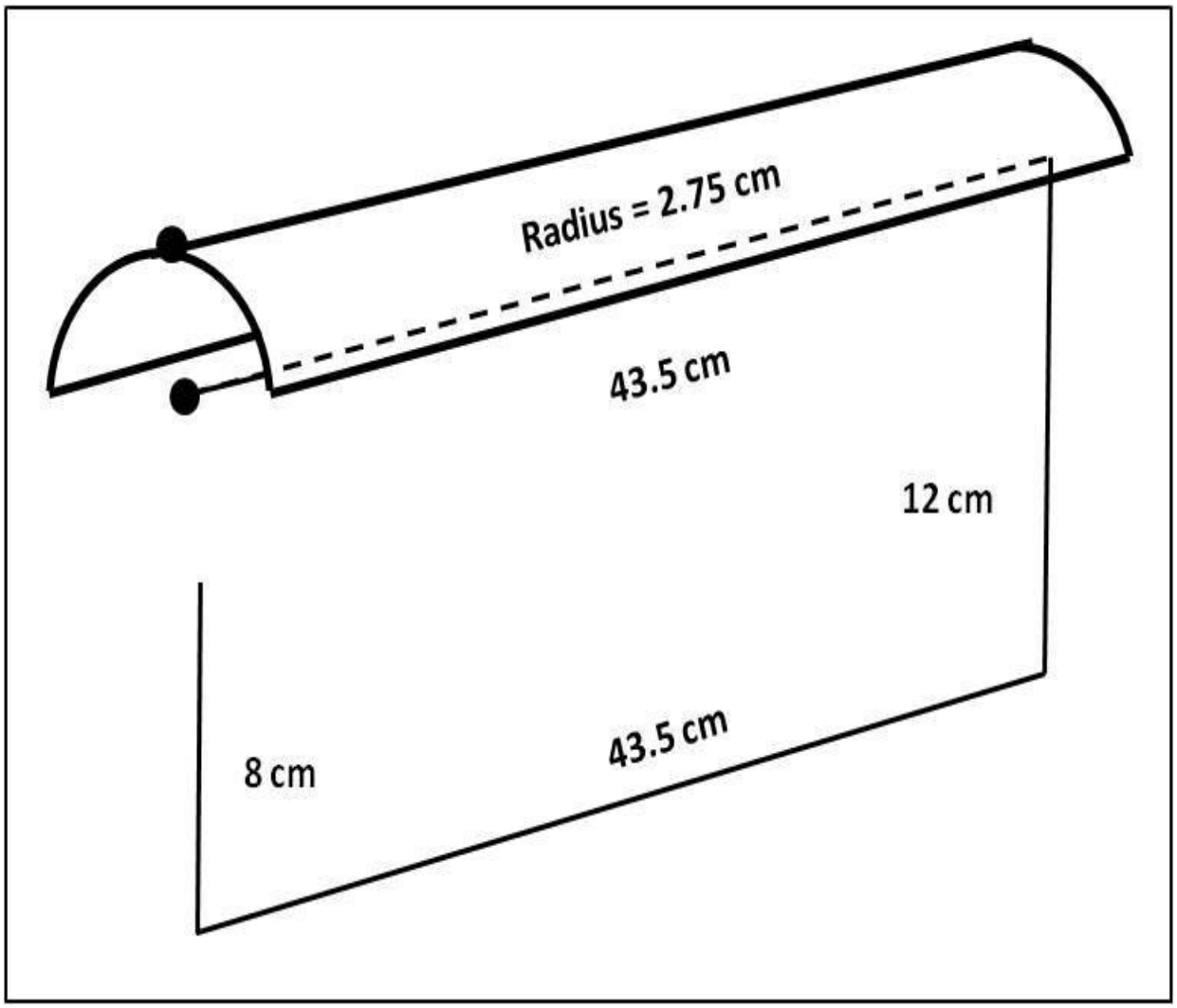
Low Voltage Frequency Response Experiments

Since virtually nothing is known about the effect of time variant input voltages on antigravity devices / machines it was decided to complete a frequency response analysis of the convergent capacitor to determine its force generation and electrical characteristics.

The axial convergent capacitor was reconstructed within a Styrofoam framework for these low voltage frequency response experiments. As shown in the following schematic the curved and wire plates were 43.5 cm long and 2.75 cm apart. The semicircular curved plate was made from aluminum. The wire plate and intensifier wire were fabricated from a single piece of 30 gauge copper wire. The position of the intensifier portion of the wire was experimentally determined from a series of tests that involved momentarily short circuiting the charged capacitor plates while observing the movement of the wire plate which was loosely held so that the presence of any force acting on it could be detected. The intensifier portion of the wire was located where maximum movement of the plate wire was observed. The axial convergent capacitor was then placed on a scale to monitor any vertical force generated by the capacitor during the frequency response experiments.

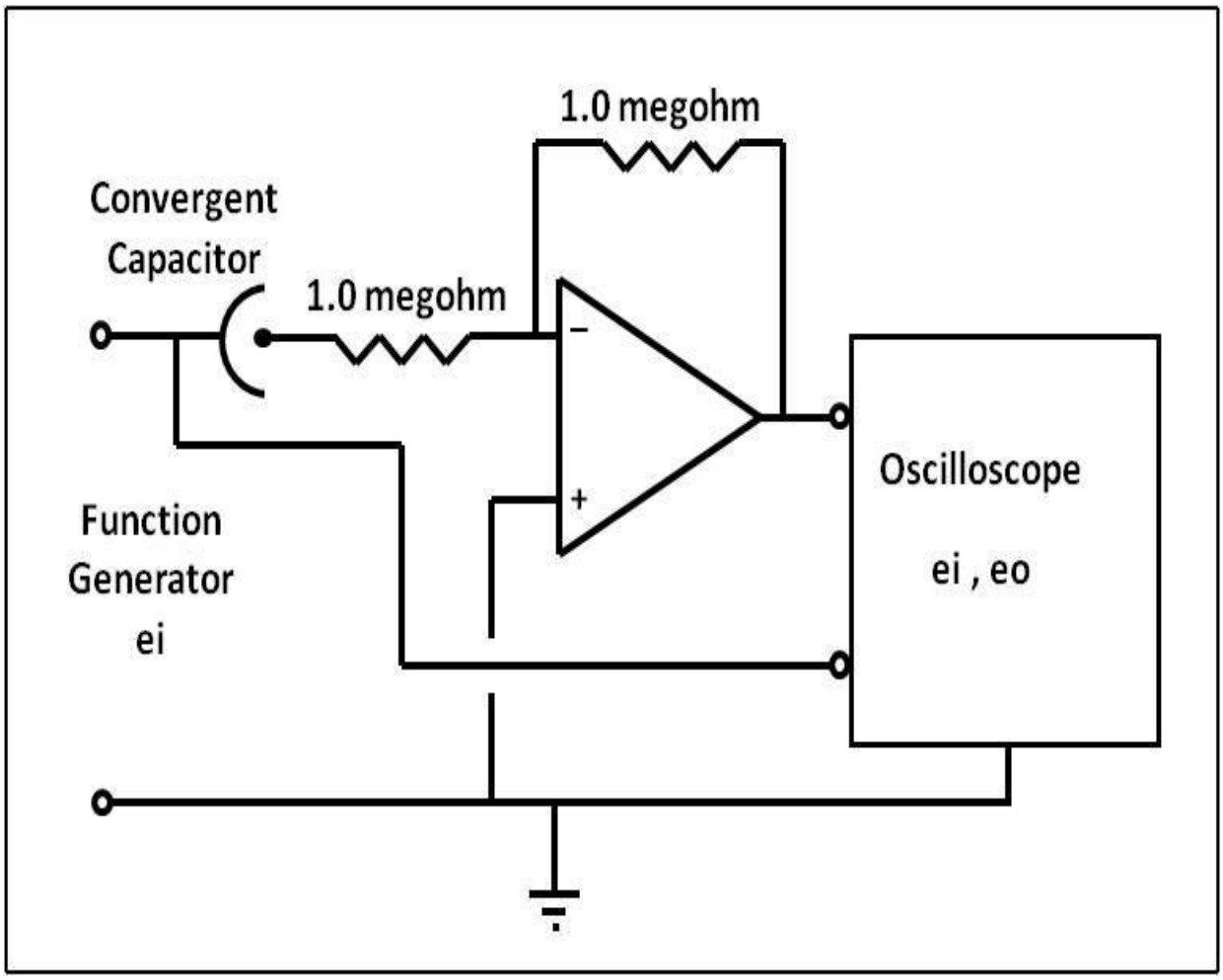


Axial Convergent Capacitor

Frequency Response Analysis

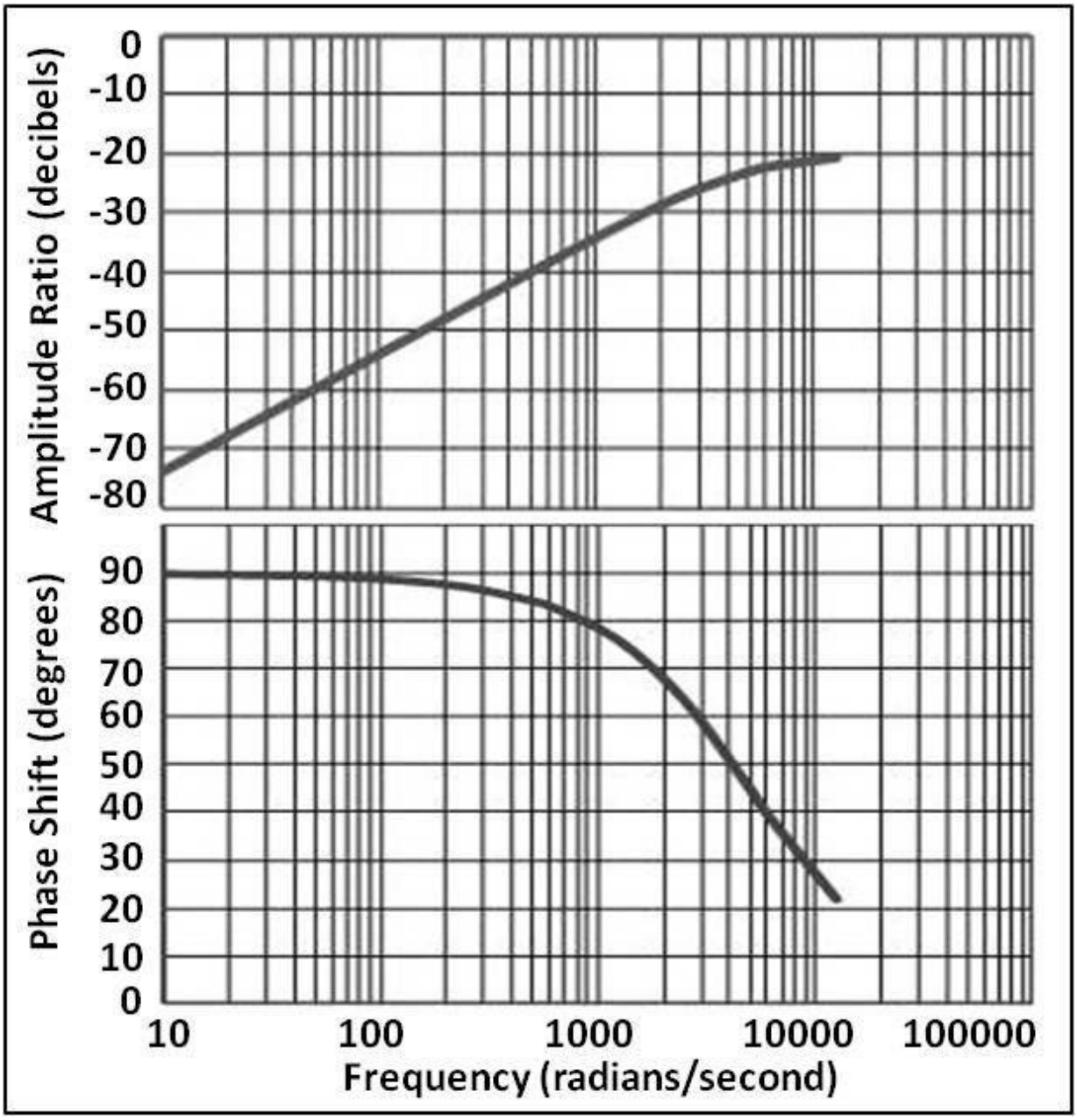
The following diagram shows the electrical circuit used for the frequency response experiments. It includes an operational amplifier whose input impedance is the axial convergent capacitor in series with a 1.0 megohm resistor. The amplifier's feedback impedance is also a 1.0 megohm resistor. The function generator inputs a 100 volt variable frequency sinusoidal voltage to the electrical circuit. The amplifier's output voltage is inverted by the oscilloscope and monitored along with the input voltage.

The results from this experiment are graphically presented in the following Bode diagram, the most convenient and comprehensive way of presenting frequency response data. As shown, the amplitude of the test circuit's output and input sinusoidal voltages are plotted as an output / input amplitude ratio (decibels) against the logarithm of frequency (radians per second). The corresponding phase shift (degrees) between the test circuit's output and input voltages is plotted immediately below the amplitude ratio curve. An explanation detailing how the frequency response data for this and other frequency response experiments were obtained and processed is presented in the APPENDIX: FREQUENCY RESPONSE ANALYSIS. For the experiment presented here the capacitance of the axial convergent capacitor was found to be 20 picofarads, and most surprising of all, there was a virtual resistance, a resistance effect without the physical presence of a resistor in the circuit, of 9 megohms in series with the capacitor.



Electrical Test Circuit

Frequency Response Analysis



Bode Diagram

Frequency Response Analysis

Several frequency response experiments were completed and the axial convergent capacitor's low voltage operating characteristics were

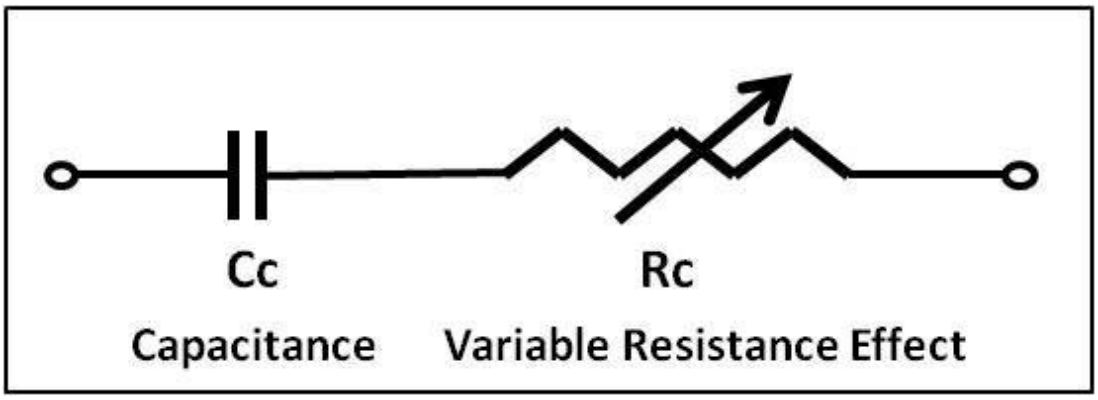
determined as follows.

>> The capacitor did not generate a significant force during the frequency response experiments which were conducted using a 100 volt amplitude variable frequency sinusoidal input voltage.

>> The axial convergent capacitor's capacitance was determined to be 20 picofarads throughout all the frequency response experiments.

>> The electrical connections to the axial convergent capacitor can be reversed without noticeably affecting the frequency response test results.

>> The axial convergent capacitor isn't simply an electrical capacitor as originally thought. It is an electrical capacitor in series with an electrical resistance effect that can vary several megohms when the magnitude of the resistor in series with the axial convergent capacitor is changed.



Axial Convergent Capacitor

Electrical Characteristics

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The Antigravity (Electrogravitic) Hypothesis

The experimental investigations offered some insight into the operating characteristics of an axial convergent capacitor. These experiments showed that the axial convergent capacitor could generate a propulsive force, albeit small, with a nominal voltage of 10,000 volts. Even more surprising was that the capacitor could generate a very weak force with a time variant (ac) voltage of 10 volts. These findings led to a series of low voltage frequency response experiments where it was found that the capacitor was actually a capacitor in series with a resistance effect that varied with test circuit operating conditions. These unusual results couldn't be explained and it was decided to complete an exhaustive analysis of the information and data gathered from the high and low voltage experiments. This proved to be a painfully slow process for several reasons.

>> The antigravity (electrogravitic) field / force generation process is an unfamiliar phenomenon.

>> The location of the field / force generation process within the axial convergent capacitor was unknown.

>> The capacitor's field / force generation characteristics were strongly dependent upon time variant differential voltages. The power supply used to obtain the experimental data outputted a time invariant (dc) voltage with a significant time variant voltage ripple. This complicated the analysis of the high voltage experimental data.

>> The antigravity (electrogravitics) field can cause unexpected effects such as a virtual electrical resistance that varies with test circuit operating conditions.

In spite of these aforementioned difficulties an analysis of the high voltage and low voltage frequency response experiments was eventually completed.

The experimental data and insights gained from these experiments indicated that an antigravity (electrogravitic) field is being generated by the rotational and axial movement of electrons along the length of the wire plate. Rotational movement of the electrons would be enhanced by the intensifier wire and axial movement would be directly relatable to the current flowing through the capacitor. The net result of this type of electron movement is a vortex-like electromagnetic field in the immediate vicinity of the plate wire that would be dependent upon the capacitor's materials of construction and geometry as well as the time invariant and time variant characteristics of its operating voltage. The interaction of the antigravity (electrogravitic) field with mass, the mass of the capacitor's structural elements and that of the electrons on the surface of the plate wire, gives rise to the virtual electrical resistance and the propulsive force generated by the capacitor. The following hypothesis summarizes these findings.

The Antigravity (Electrogavitic) Hypothesis

An electromagnetic field in a vortex-like configuration can generate an antigravity or gravity-like field that interacts with the mass of the device to generate a propulsive force and the mass of the electrons on the surface of the device to alter its electrical characteristics.

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THE ZERO POINT ENERGY

(ZPE) MODEL

The professional and social repercussions of being involved with the phenomenon of antigravity caused me to adopt a research management strategy that maintained a reasonable level of secrecy until some explanation could be found. My initial attempts to explain antigravity were based on mainstream science and I reviewed, analyzed and hypothesized the possibilities without success. Gradually I accepted that antigravity, unlike gravity which is a naturally occurring ubiquitous phenomenon, is localized and requires specific and seemingly unexplainable operating conditions involving the control of charge, or more specifically electrons.

The realization that antigravity has to be addressed differently from gravity can go far beyond technology and science. In my case it forced me to review and assess my background, my education, my training, my personal experiences, my professional experiences and most importantly my conservative attitude to the unusual and unknown. This led me to the conclusion that one must first understand mainstream science's basic field / force generation processes before making any attempt at explaining the confusing array of experimental observations and claims being made by antigravity researchers.

With regard to mainstream science the following questions have to be addressed.

>> The physical properties and characteristics of mass (inertia, gravity, ...) and charge (including electric and electromagnetic fields, ...) are derived

from their respective energy constructs. What are these energy constructs?

>> The different field / force generation processes involve mass or charge. What role do these entities play in these processes?

Once the mass and charge issues are resolved the following questions specific to antigravity need to be addressed.

>> How do you manipulate electrical parameters, voltage, charge, current, magnetism and electromagnetism to realize an antigravity or a gravity-like field?

>> How does the antigravity or gravity-like field interact with mass to generate an antigravity or gravity-like force?

>> How can a moving mass generate an antigravity or a gravity-like field / force?

>> Can antigravity related phenomena be integrated into mainstream science?

To address these issues the Zero Point Energy (ZPE) model to be developed here defines a unique energy interpretation of mass, charge and their related field / force generation processes, including antigravity.

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The ZPE Model Continuum

Throughout history the concept of an all pervading continuum has been referred to as aeather, primordial energy, zero point energy, quantum space, the space-time continuum, … , and yes, it has even been deemed nonexistent, a figment of the imagination. Of interest here is quantum space which is considered to be an empty vacuum full of electromagnetic waves of all wavelengths with concentrations of energy coming into and out of existence. In 1948, with this interpretation in mind, Dutch physicist Hendrich Casimir theoretically defined the attractive forces between two closely spaced fully conductive plates in a vacuum. These plates, which act as mirrors to electromagnetic waves, allow a standing wave to be formed when the distance between the plates is set such that it is an integer multiple of the electromagnetic wavelength. This condition doesn't exist outside the cavity and as a result of this (energy) imbalance the plates are forced together by what is termed the Casimir force. It wasn't until 1996 that Steven Lamoureaux measured the Casimir force to within 5 percent of Casimir's predicted value. The reason for the delay was the technology required for the experiment. Casimir's plates had to be parallel and no further apart than 1 micron.

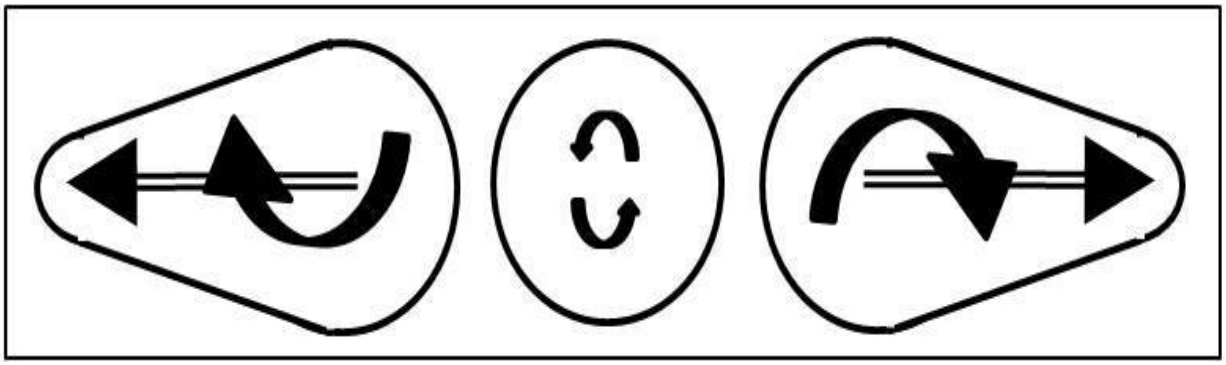
The Zero Point Energy (ZPE) model assumes the existence of an all pervading energy aeather in which energy waves of all types travel and the transient energy concentrations predicted by quantum theory coexist with stable concentrations of energy such as mass and charge. This energy aeather is assumed to consist of energy elements that act as an energy sink or source for both the stable and transient energy concentrations and a medium through which the various fields travel. The energy aeather is globally stationary but continually reacting to local conditions. When disturbed these energy elements are assumed to react en masse to form a free energy element. The energy associated with a free energy element is considered to be rotational in nature with the axial distribution of rotational energy determining its translational movement. The free energy element's basic

energy and movement characteristics are defined by the left and right hand rules.

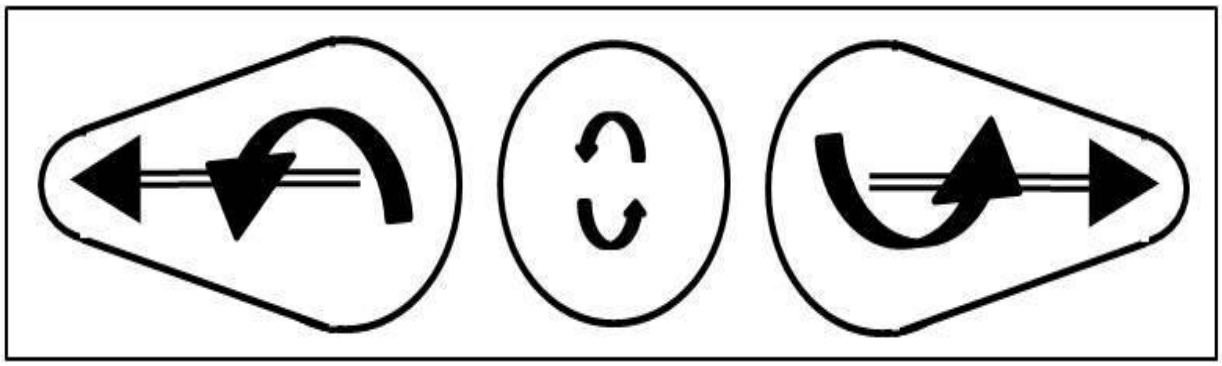
Left Hand Rule (LHR): Place the palm of the left hand on the free energy element with the thumb pointing in the direction of travel. The free energy element's direction of rotation is in the direction that the fingers are pointing.

Right Hand Rule (RHR): Place the palm of the right hand on the free energy element with the thumb pointing in the direction of travel. The free energy element's direction of rotation is in the direction that the fingers are pointing.

The following graphics illustrate the Right Hand Rule (RHR) and the Left Hand Rule (LHR). The distribution of rotational energy along the free energy element's axis of rotation defines the direction of travel, if any. It should be noted that the ZPE model acknowledges that the rotational energy distribution along the length of the free energy element's axis of rotation can take a multitude of forms, not just those illustrated here



Free Energy Element (RHR)



Free Energy Element (LHR)

In summary, the ZPE model assumes the existence of an energy aether or continuum comprised of energy elements that coalesce into free energy elements when experiencing a local disturbance. These free energy elements can interact with one another to allow the transmission of energy waves and coalesce to form both stable and transient energy entities that interact with the surrounding energy continuum. The energy aether or continuum is globally stationary.

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The ZPE Neutron (Mass) Model

The ZPE model of mass must accommodate our understanding of its characteristics and properties as defined by the following relationships.

>> Albert Einstein's Theory of Special Relativity, E = m c**2

>> Albert Einstein's Theory of Special Relativity, m = mo / [1 – (v / c)**2]**1/2

>> Isaac Newton's Second Law of Motion, F = m a

>> Isaac Newton's Law of Universal Gravitation, F = G m1 m2 / r**2

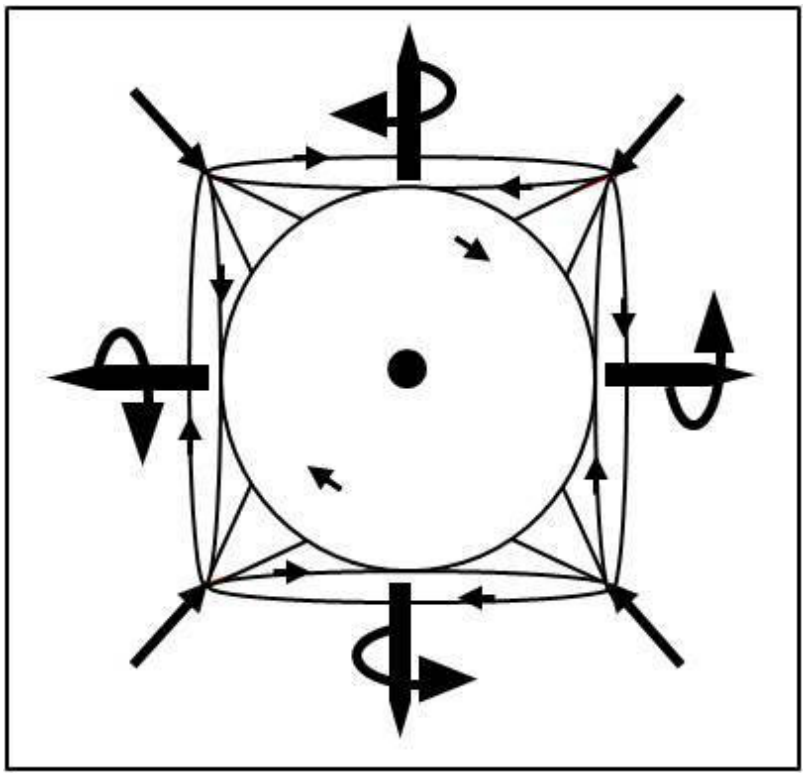
>> Albert Einstein's Theory of General Relativity

These are in effect black box mathematical relationships that define but do not physically explain the energy and force generation characteristics associated with mass. Furthermore, the question of whether the gravitational characteristics of mass are due to a field / force interaction process as suggested by Newton's Law of Universal Gravitation or a distortion of the space-time continuum as per Einstein's Theory of General Relativity is still being debated.

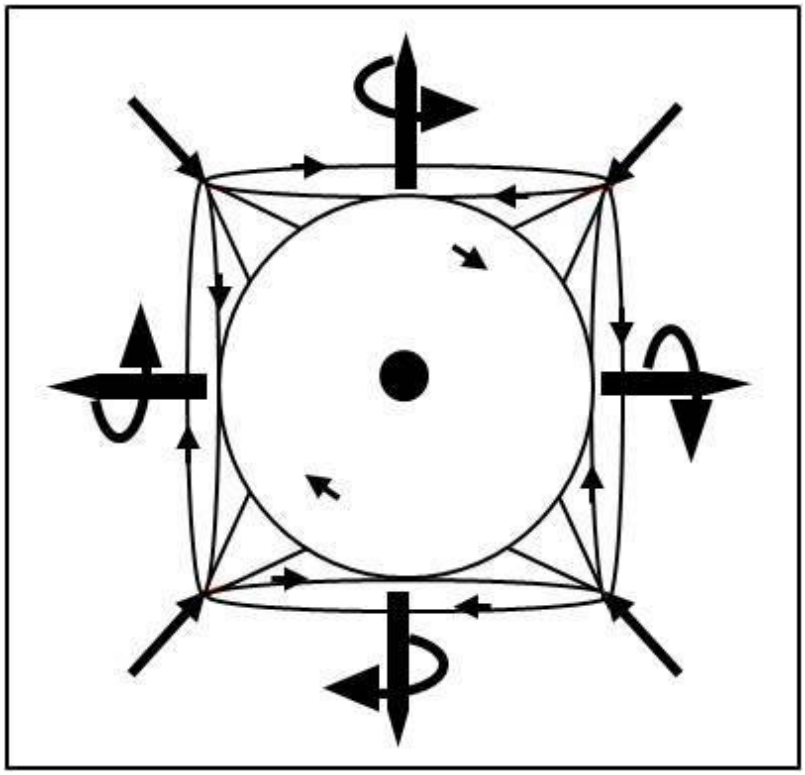
The ZPE model assumes that mass / mass energy, the neutron, is a dynamic configuration of free energy elements that is in a self adaptive equilibrium with the surrounding energy aether or continuum. The model's conceptualization of mass / mass energy is a periphery of inward and outward facing free energy element vortices. The free energy elements associated with the outward facing vortices rotate in a clockwise (CW) or counter clockwise (CCW) direction with their spin defined by the Left Hand Rule (LHR) or Right Hand Rule (RHR). The free energy elements associated

with the inward facing vortices have the same spin as their counterparts in the outward facing vortices but rotate around in the opposite direction. The flow of energy from the outward facing vortices is considered to be the mass / mass energy entity's gravitational field and the inward flow of energy, generated by the inward facing vortices around the mass / mass energy's periphery, replenishes the energy losses associated with the gravitational field. Because of this inward and outward flow of energy the ZPE model considers mass to be a self adaptive open energy system.

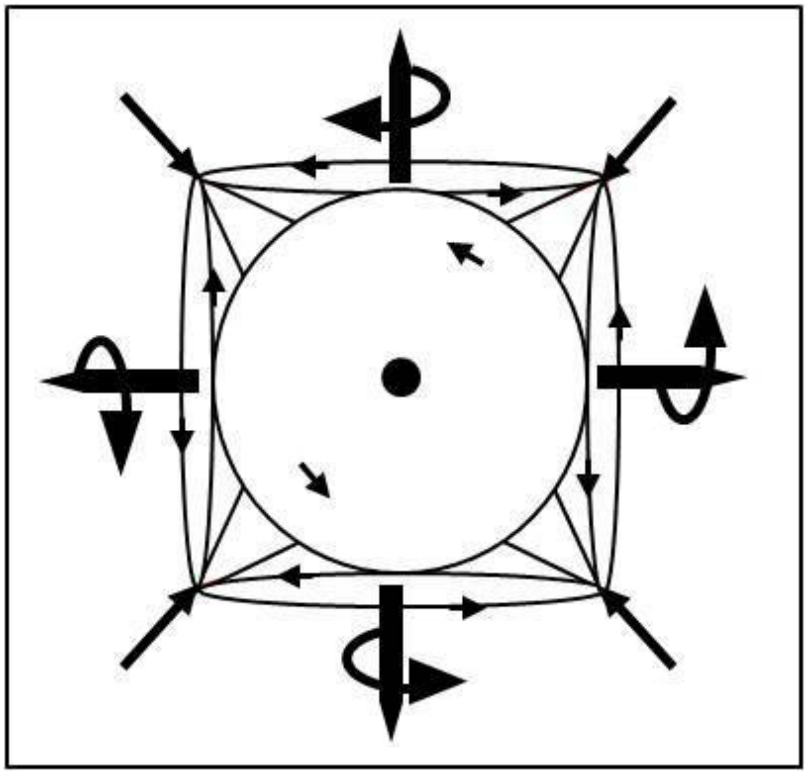
The following illustrations summarize all the possible ZPE models of mass in terms of rotation and spin combinations that the free energy elements comprising the model's outward facing vortices can assume. The mass / mass energy entity itself is considered to be at zero or constant velocity and continuously rotating with infinitesimally small vibratory like movements. On average the mass entity's energy distribution is balanced in every direction and as a consequence there is no net force being generated by the entity.



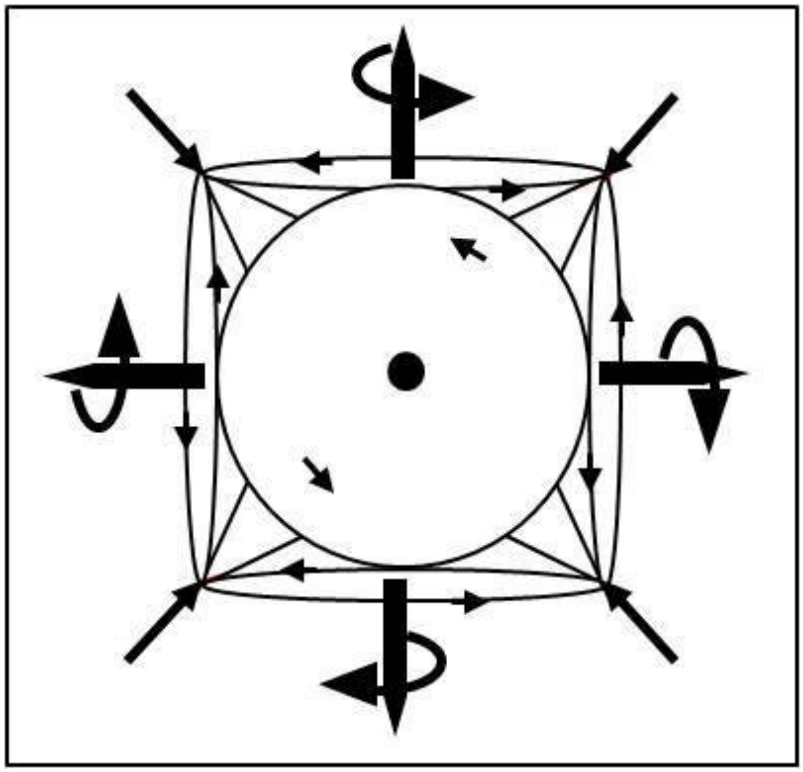
ZPE Mass Model (CW/LHR)



ZPE Mass Model (CW/RHR)



ZPE Mass Model (CCW/LHR)



ZPE Mass Model (CCW/RHR)

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Sir Isaac Newton stated his Second Law of Motion, F = m a , over three centuries ago when mass was considered to be some inert blob with a tendency to remain stationary or continue in its direction of travel until a force, F , is applied to change its velocity. This interpretation isn't that much different from ours today even though mass is now considered to be energy. Referring to Cutnell, John D. and Johnson, Kenneth W., "Physics 3rd edition", John Wiley & Sons, Inc., 1995,

"Inertia is the natural tendency of an object to remain at rest or in motion at a constant speed along a straight line. The mass of an object is a quantitative measure of inertia."

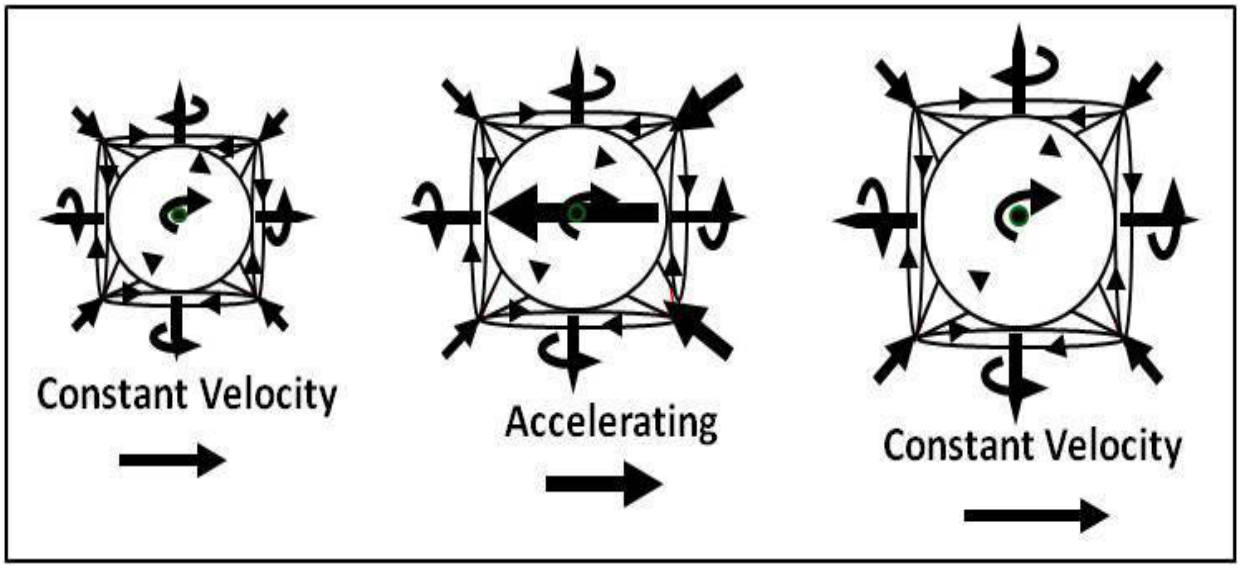
However, over two centuries ago the French mathematician Jean le Rond d'Alembert (1717-1783) offered another interpretation. He proposed that the resistance of mass to a change in velocity could be viewed as a force generated by the mass particles themselves. Mathematically speaking this idea simply involved rearranging Newton's Second Law to obtain what is termed d'Alembert's Principle,

$$\mathbf{F - m\,a = 0\ .}$$

Even though d'Alembert's Principle doesn't change or violate Newton's Second Law of Motion it does change our perception of mass from an entity with the property of inertia to one that generates force when it experiences a change in velocity. The ZPE model assumes that when a mass changes its velocity it generates a force opposing this change.

The ZPE model's interpretation of d'Alembert's Principle is illustrated in the following sketch. Initially the ZPE neutron (mass) is moving at a constant velocity and its energy distribution is balanced in all directions with no force being generated by the entity. When the neutron (mass) is accelerated there is an increase of energy at the leading edge of the entity causing an energy imbalance that generates a force, m a , directed from high to low energy and opposing the external force, F , causing the acceleration. During this process the mass / mass energy entity continues to rotate around redistributing the excess energy at the leading edge causing the entity's overall energy to increase. When the external force is removed the mass energy configuration self adapts to a balanced energy distribution and continues on at constant velocity. The magnitude of the energy associated with the mass energy entity

is sustained within its free energy element vortices configuration and is dependent upon the velocity of the mass.



The ZPE Model of Inertia (Acceleration)

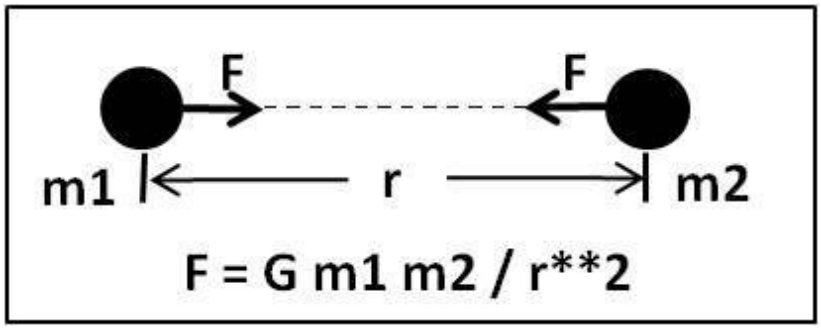
In the case of deceleration the entity experiences a decrease in energy inflow at its leading edge. A force opposing the external force causing the deceleration is generated and the overall energy associated with the mass / mass energy entity decreases.

******

Mainstream science is still debating gravity, masses attracting each other. Einstein's Theory of General Relativity attributes gravity to a distortion of the space-time continuum in the immediate vicinity of the mass and Newton's Law of Universal Gravitation suggests that it is the result of a gravitational field that interacts with mass to generate the forces that attract

the masses together. Since the goal here is to develop a physically realistic conceptual model of mass that includes gravity, the luxury of endless debate must be brought to a close and a decision made.

The insights gained from the claims made by antigravity researchers and the experimental investigations with the axial convergent capacitor indicate that antigravity is an electrically based field / force phenomenon and as a consequence preference is given to Newton's Law of Universal Gravitation.



The following assumptions are implicit to Newton's Law of Universal Gravitation.

>> The gravitational field being generated by a mass is directly proportional to the magnitude of the mass.

>> The gravitational field generated by a mass radiates outwards equally in all directions and is unaltered by any interaction that may occur during its travel from one mass to another.

>> The gravitational field's travel time between the masses is zero.

>> The gravitational force generated by a mass is directly proportional to the magnitude of the mass and the gravitational field impinging upon it.

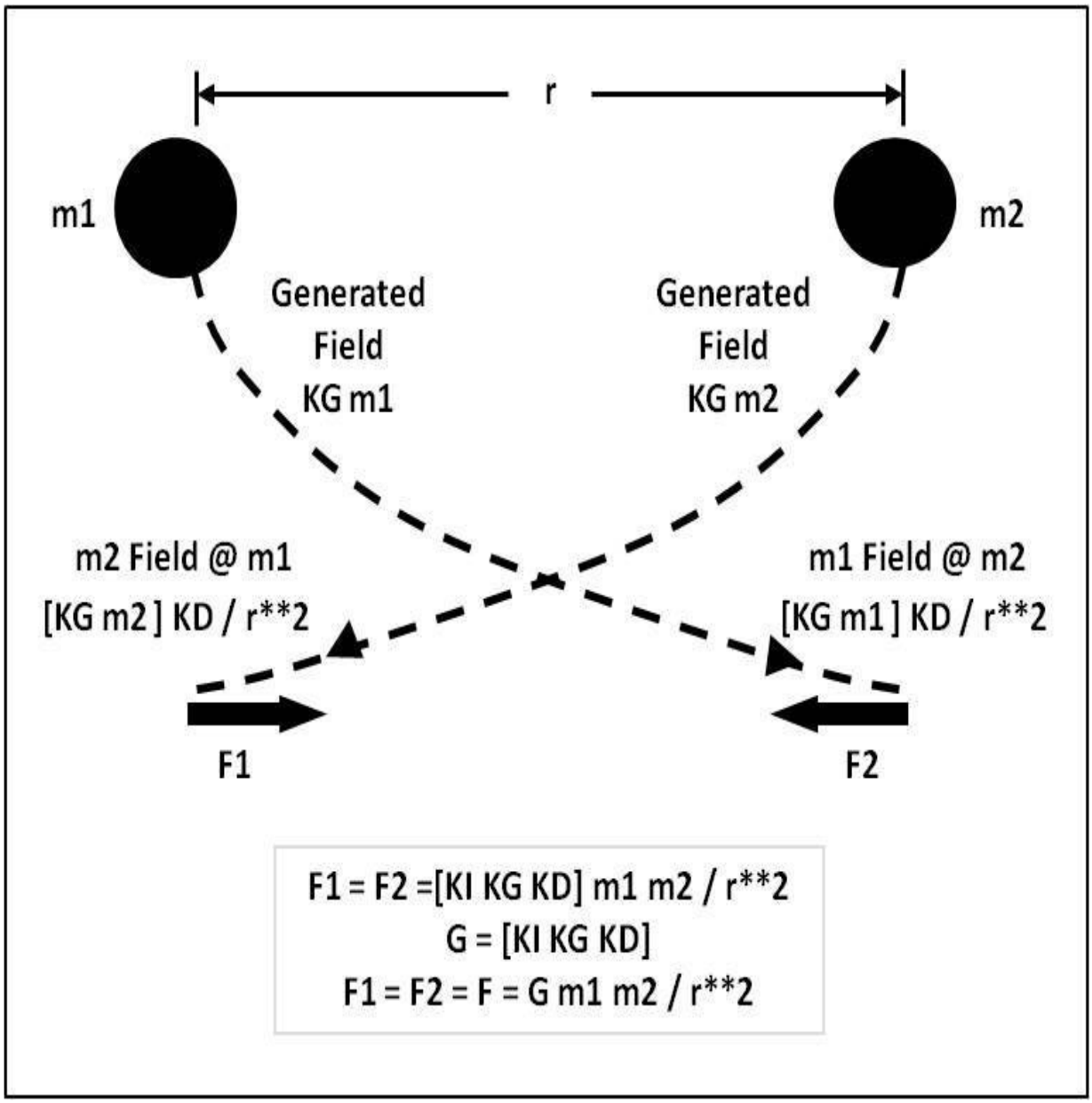
Referring to the following illustration, the ZPE model interprets Newton's Law of Universal Gravitation as a three stage process involving three proportionality constants, the mass / field generation constant, KG , the distance / field intensity constant, KD , and the field / force generation constant, KI .

>> The gravitational fields generated by mass m1 and m2 are KG m1 and KG m2 , respectively.

>> The intensity of the gravitational field generated by mass m1 and m2 at a distance r from these masses is (KG m1) KD / r**2 and (KG m2) KD / r**2 , respectively.

>> The generation of the gravitational forces, F1 = KG KD KI m1 m2 / r**2 and F2 = KG KD KI m1 m2 / r**2 , are directly proportional to the magnitude of the gravitational field that interacts with masses m1 and m2 . These forces attract the masses together and the product of the proportionality constants, KG KD KI , equals the Universal Gravitation Constant, G .

This interpretation doesn't change Newton's Law but does highlight the key processes associated with gravity - the generation of a field by a mass, transmission of the field to another mass, and finally, the interaction of the field impinging on the other mass to generate a force. This process occurs in both directions simultaneously to yield the gravitational forces that attract the two masses together. It should be noted that both Newton's Law of Universal Gravitation and the ZPE model's interpretation of this law implicitly assume that the field radiating from a mass is unaltered by any interaction that may occur as it instantaneously travels to the other mass.



The ZPE Model's Interpretation of Gravity

According to the ZPE neutron (mass) model the free energy elements within the mass / mass energy entity's outward facing vortices generate the gravitational field and can have the following possible directions of rotation and spin.

>> CW/LHR (Clockwise Rotation / Left Hand Rule Spin)

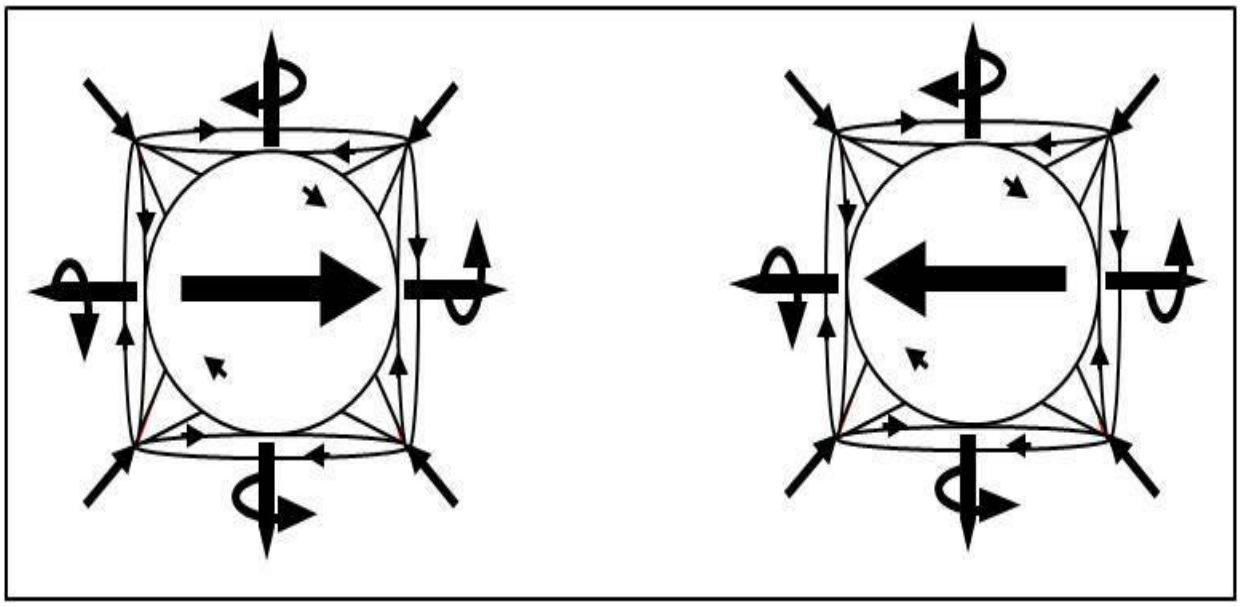
>> CW/RHR (Clockwise Rotation / Right Hand Rule Spin)

>> CCW/LHR (Counter Clockwise Rotation / Left Hand Rule Spin)

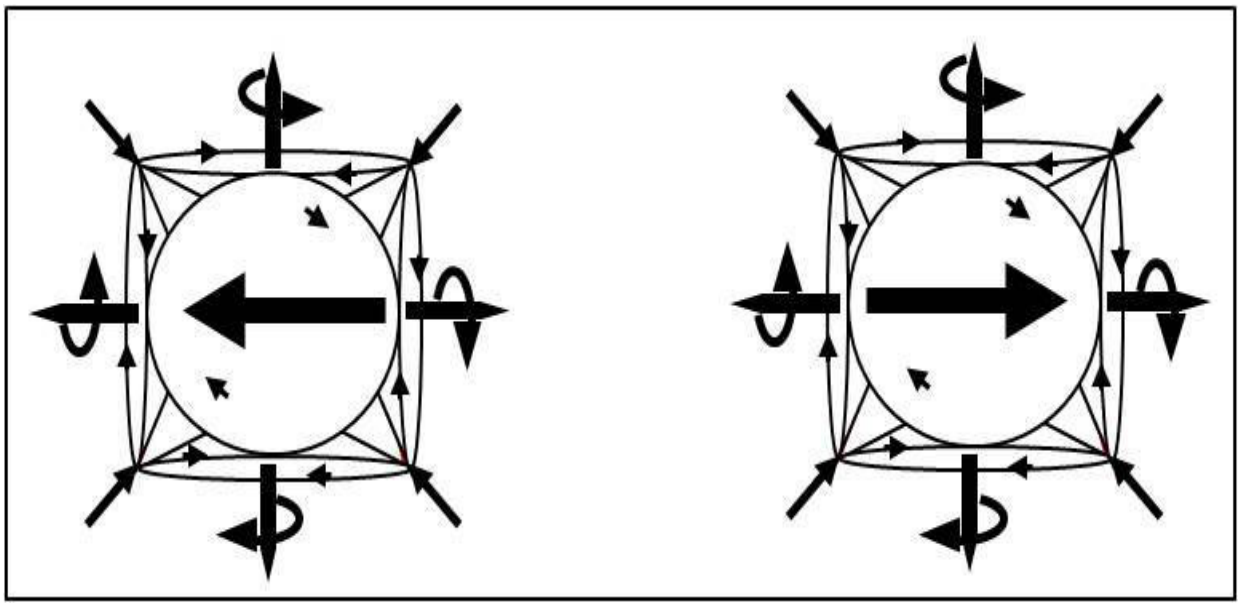
>> CCW/RHR (Counter Clockwise Rotation / Right Hand Rule Spin)

The direction of rotation of the free energy elements, clockwise or counter clockwise, is as viewed from outside of the mass / mass energy entity and the direction of their spin is defined by either the left hand rule or right hand rule.

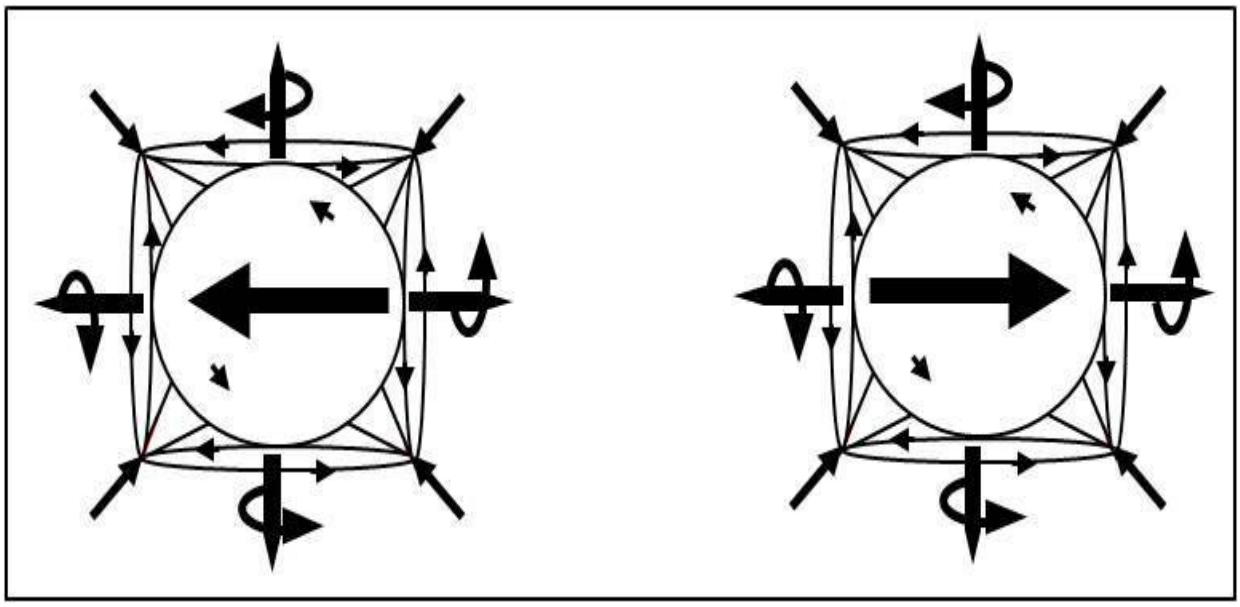
The ZPE model's conceptualization of gravity as a field / force phenomenon is shown in the following illustrations for all possible neutron (mass) model rotation and spin combinations. When the spin of the gravitational field generated by the outward facing vortex of one mass / mass energy entity counters the rotation or decreases the rotational energy of the outward facing vortex of the other mass / mass energy entity, that entity s energy distribution is altered causing a gravitational force to be generated (black arrow) in the direction of the mass / mass energy entity generating the field. This occurs simultaneously in both directions causing the mass / mass energy entities to be attracted to each other. If the opposite occurs, the gravitational field generated by a mass / mass energy entity increases the rotational energy of the outward facing vortex of the mass / mass energy entity it impinges upon then the forces being generated are repulsive and that ZPE neutron (mass) model is considered to be invalid.



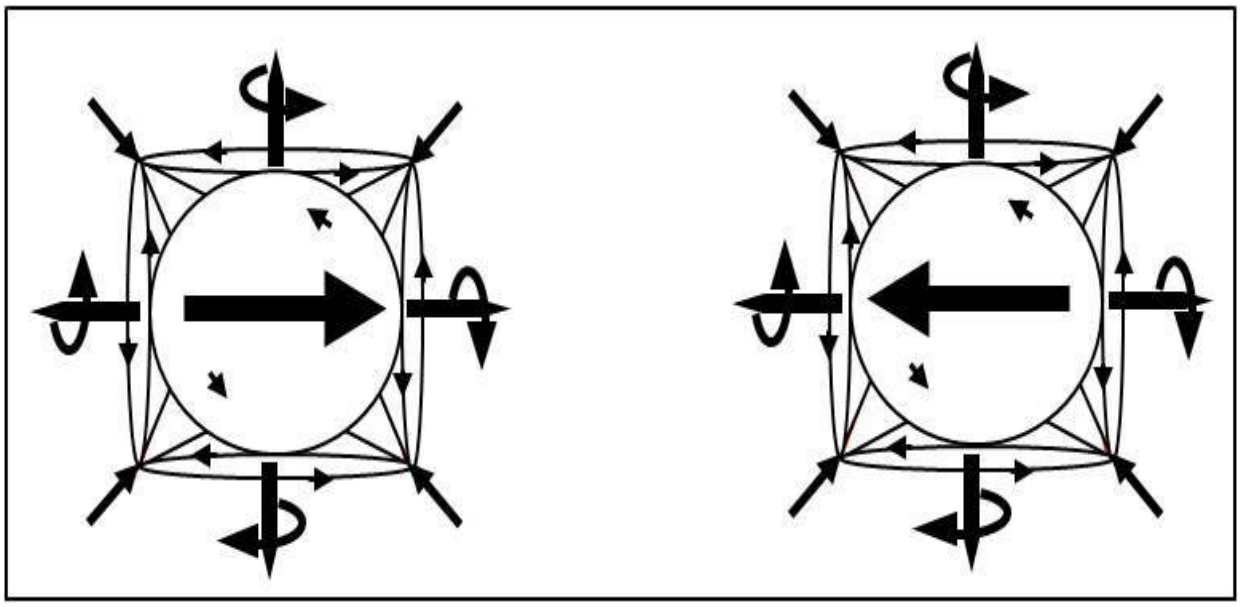
ZPE Field / Force Gravity Model (CW / LHR)



ZPE Field / Force Gravity Model (CW / RHR)



ZPE Field / Force Gravity Model (CCW/LHR)



ZPE Field / Force Gravity Model (CCW/RHR)

The ZPE neutron (mass) models, CW/LHR and CCW/RHR, cause the mass / mass energy entities to be attracted to each other or they satisfy the gravitational characteristics of mass. Which of these two models are correct remains to be determined.

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The ZPE Electron and Proton (Charge) Models

Mainstream science describes the electron and proton as a mass with electrical properties. The ZPE model conceptualizes the electron and proton as an energy entity with two fundamentally different free energy element configurations, one defining its mass and the other its electrical characteristics.

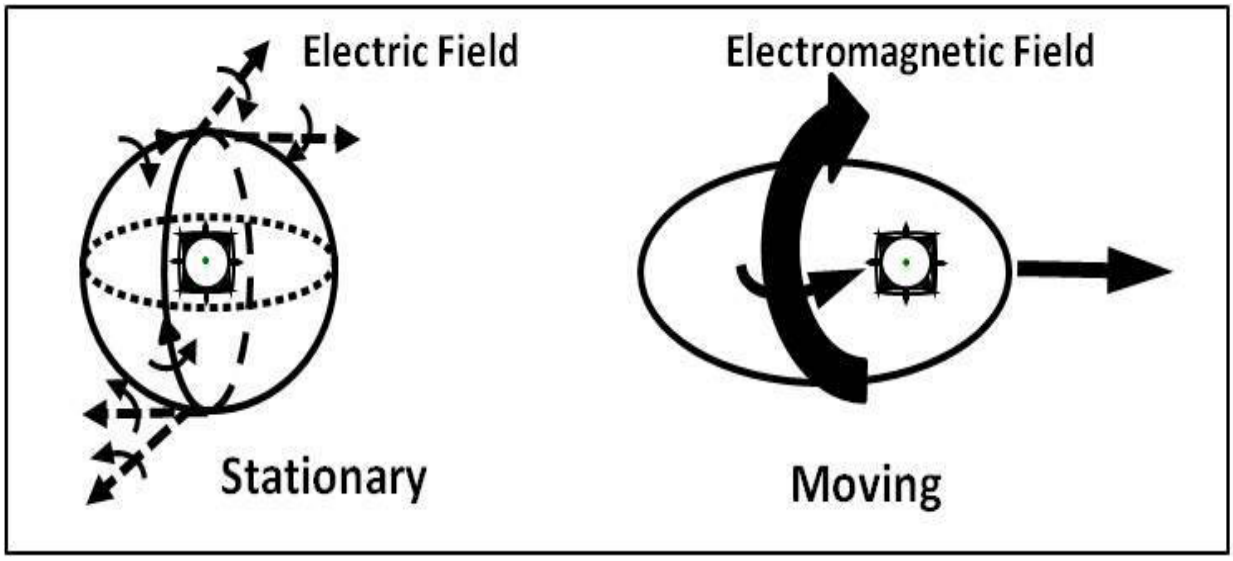
As previously discussed, the ZPE neutron (mass) model is assumed to be a periphery of inward and outward facing vortices of free energy elements that can be altered by a change in velocity or a gravitational field. The energy imbalance resulting from these interactions are redistributed by means of the entity's rotational and vibratory movements to obtain a balanced mass energy distribution at constant velocity. The ZPE model for charge assumes that these mass related characteristics also apply to the electron and proton's mass / mass energy entity. It also assumes that the charge's mass / mass energy entity sustains an envelope of free energy elements that orbit around it. These free energy elements, referred to here as charge related free energy elements, define the electrical characteristics of the electron and proton.

The ZPE model envisages the outer periphery of an electron or proton as an envelope of charge related free energy elements that are spinning as they orbit around their respective mass / mass energy core. The orbital direction of travel of these charge related free energy elements can be clockwise (CW) or counter clockwise (CCW) with their spin defined by the Right Hand Rule (RHR) or the Left Hand Rule (LHR). The electrical characteristics of an electron or proton is defined in terms of the orbital rotation and spin characteristics of its charge related free energy elements. Like the ZPE neutron (mass) model, the ZPE electron and proton (charge) models are considered to be self adaptive open energy systems. The following

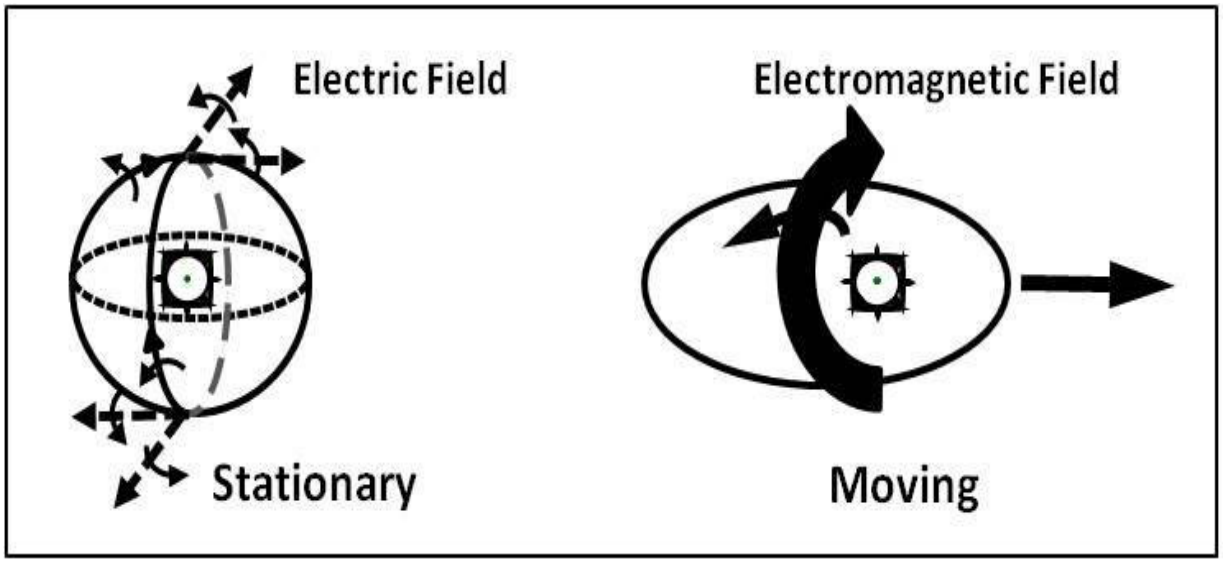
illustrations highlight the anticipated shape of the charge related free energy element envelope and the fields they generate when stationary and moving.

A stationary charge's electric field is generated by the charge related free energy elements interacting with the energy aether surrounding the stationary charge. The electric field emanates in all directions from the charge and its spin is the same as that of the charge related free energy elements generating the field. The energy loss associated with the electric field is replenished by a flow of energy from the charge's mass / mass energy core. It is assumed that on average the energy from the charge's mass / mass energy core is uniformly distributed as is the interaction of the charge's charge related free energy elements with the energy aether surrounding it. As a consequence, the shape of a stationary charge is considered to be spherical as illustrated in the following illustrations.

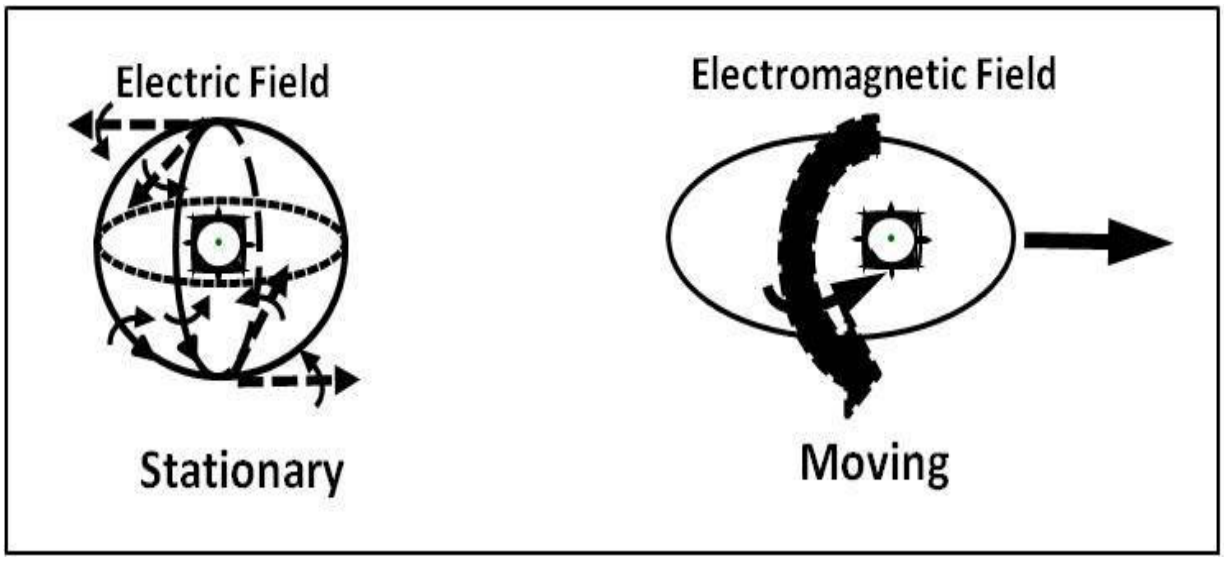
The charge related free energy envelope surrounding a moving charge is radically different from that of a stationary charge. The interaction of a moving charge's charge related free energy elements with the energy aether is no longer equal in all directions and the shape and dynamics of the charge related free energy element envelope is altered. That is, when the charge is moving the charge related free energy elements interact with the energy aether and are deflected to the side as they approach the charge's leading edge. The net effect is the formation of an ellipse-like charge envelope accompanied by an enhanced rotation of charge related free energy elements around the charge's direction of travel. This enhanced rotation of charge related free energy elements is considered to be what is commonly termed the electromagnetic field surrounding a moving charge. In the following illustrations the large black curved arrow around the moving charge illustrates the rotation and spin of the electromagnetic field defined by the charge related free energy elements comprising it.



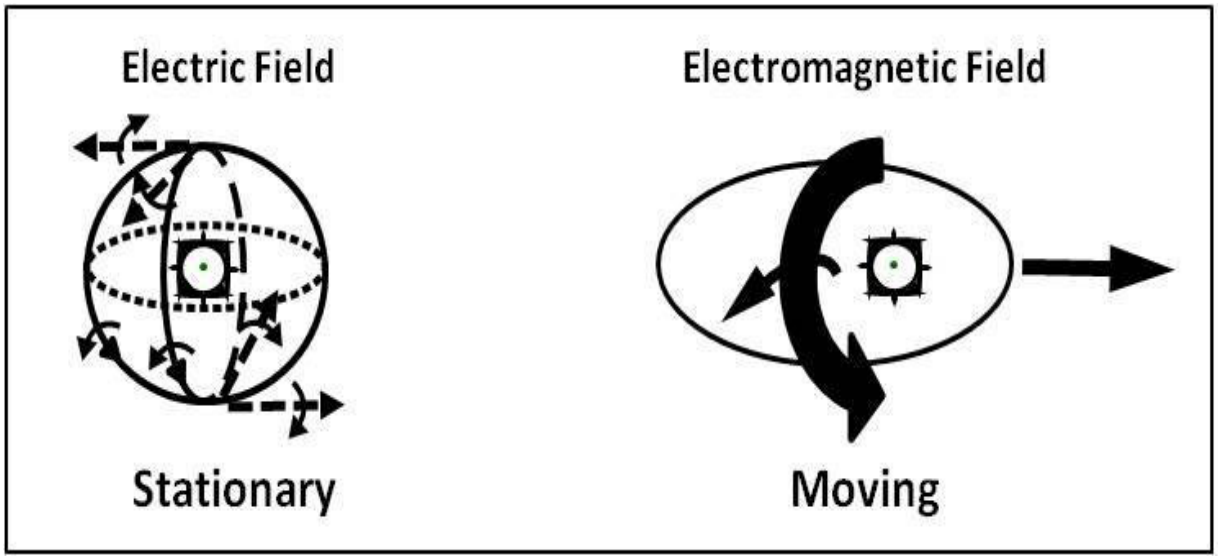
The CW/RHR Charge Model Fields



The CW/LHR Charge Model Fields



The CCW/LHR Charge Model Fields



The CCW/RHR Charge Model Fields

The ZPE charge models for a stationary and moving charge have been presented but which of these is the electron and which is the proton must still be determined. To resolve this issue the basic electric field / electrostatic

force and the (electro)magnetic field / force generation processes are now investigated.

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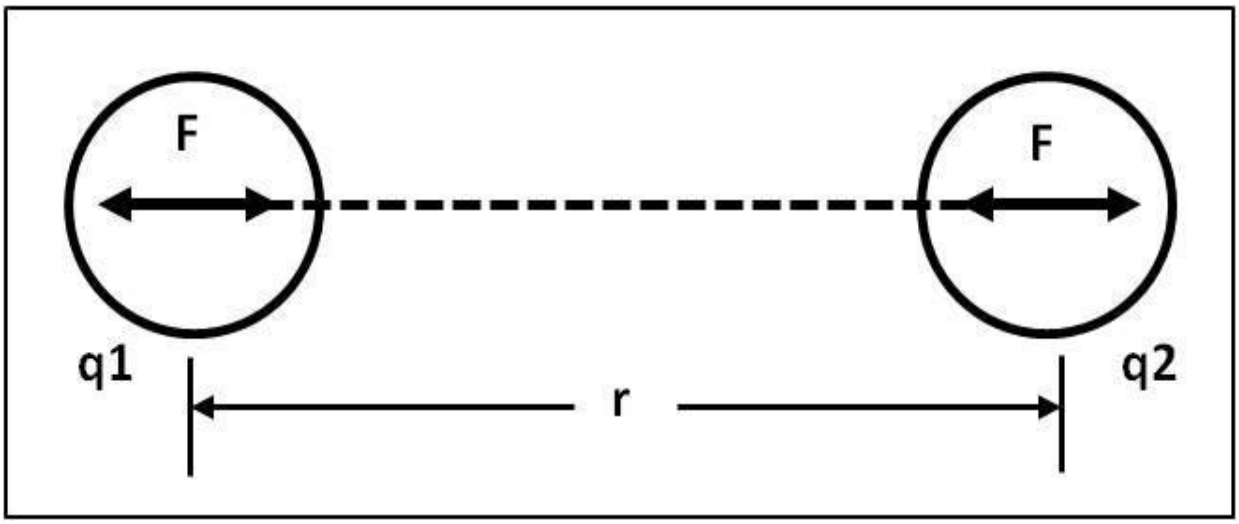
Electric Fields and Electrostatic Forces

The mathematical relationship defining electrostatic force, Coulomb's Law, is similar in form to Newton's Law of Universal Gravitation. However, unlike gravity mainstream science accepts that the generation of an electrostatic force arises from the interaction of an electric field with charge. Unfortunately mainstream science doesn't physically explain charge, how the electric field is generated or how the charge / electric field interaction process generates the electrostatic force. These issues are of immediate concern here.

Coulomb's Law defines electrostatic force in terms of charge, q1 and q2 , and distance, r . k is a proportionality constant. The electrostatic forces are directed along the line joining the charges, and they are attractive if the charges have unlike signs and repulsive if the charges have like signs.



The following assumptions are implicit to Coulomb's Law.

>> The electric field generated by a charge is directly proportional to the magnitude of the charge.

>> The electric field generated by a charge radiates outwards equally in all directions and is unaltered by any interaction that may occur during its travel to the other charge.

>> The electric field's travel time between the charges is zero.

>> The electrostatic force generated by a charge is directly proportional to the magnitude of the charge and the electric field impinging upon it.

Referring to the following illustration, the ZPE model presents Coulomb's Law as a three stage process involving three proportionality constants, the charge / field generation constant, kG , the distance / field intensity constant, kD , and the field / force generation constant, kI .

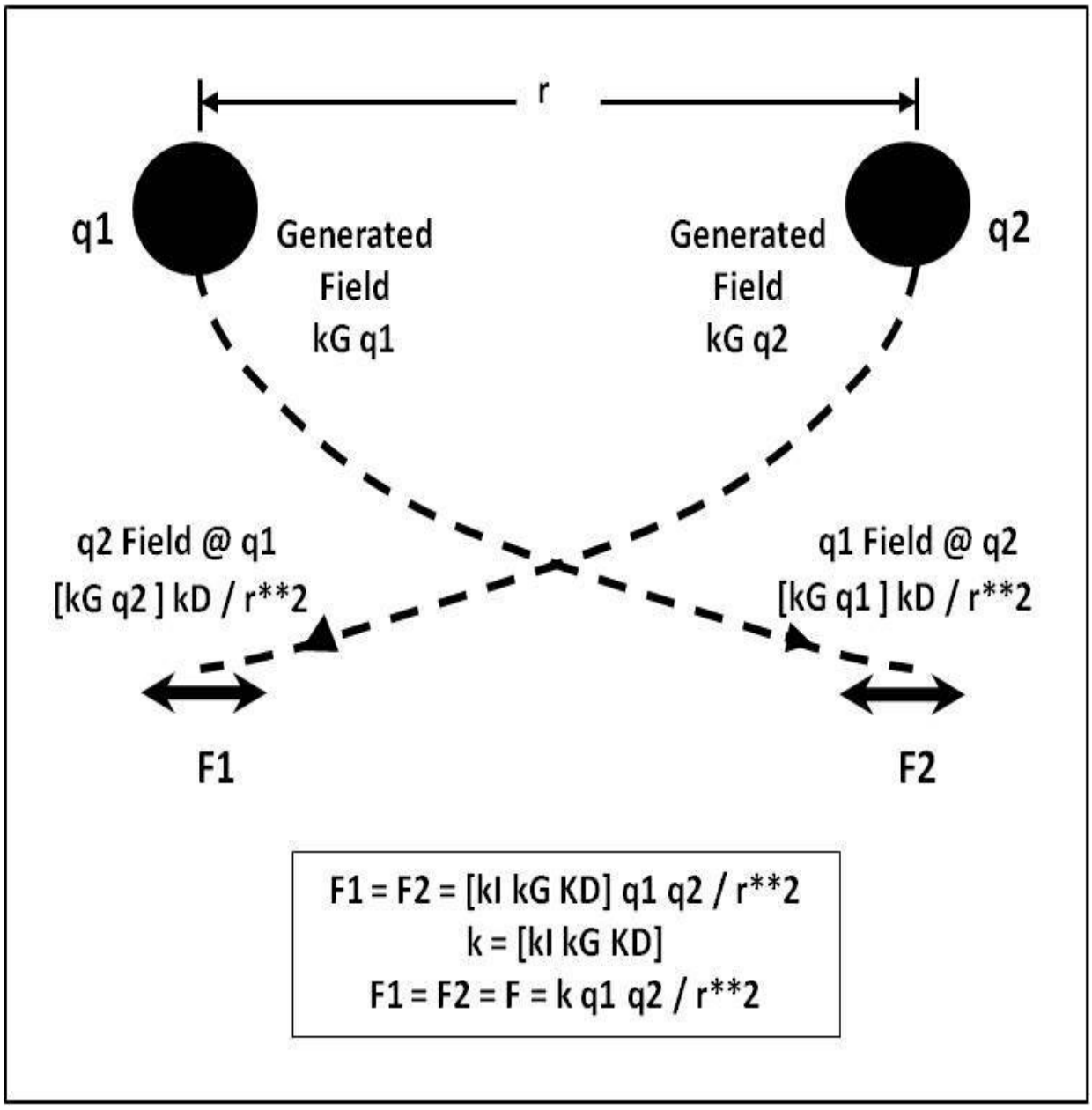
>> The electric fields generated by charge q1 and q2 are kG q1 and kG q2 , respectively.

>> The intensity of the electric field generated by charge q1 and q2 at a distance r from them is (kG q1) kD / r**2 and (kG q2) kD / r**2 , respectively.

>> The electrostatic forces, F1 = kG kD kI q1 q2 / r**2 and F2 = kG kD kI q1 q2 / r**2 , are directly proportional to the electric field that interacts with charge q1 and q2 and equal in magnitude since the product of the three proportionality constants, kG kD kI , equals k in both cases. These forces are attractive if the charges have unlike signs and repulsive if the charges have like signs.

The ZPE model's interpretation doesn't change Coulomb's Law but does highlight the key processes involved with generating an electrostatic force - the generation of an electric field by a charge; transmission of the electric field to another charge; and finally, the interaction of the electric field

impinging on the other charge to generate the electrostatic force. This field / force generation process occurs in both directions simultaneously. The ZPE model, like Coulomb's Law, assumes that the electric field is unaltered as it instantaneously travels from one charge to another.



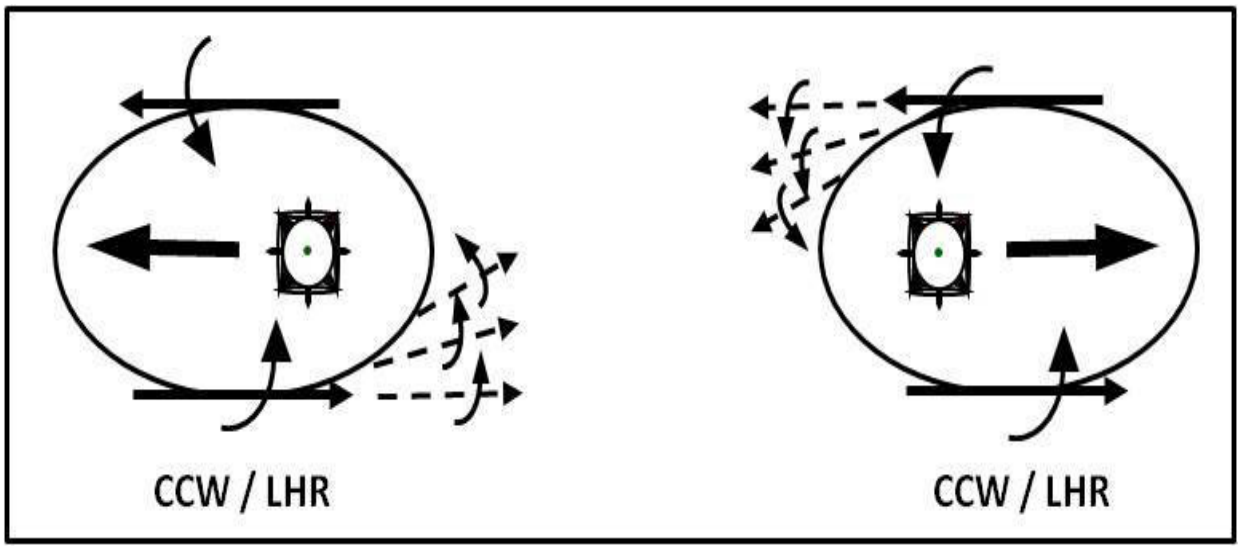
ZPE Model's Interpretation of Coulomb's Law

The rotation / spin of the charge related free energy elements orbiting a charge could be CW/LHR, CW/RHR, CCW/LHR or CCW/RHR. For two charges we have the following possibilities.

Charge 1	Charge 2
CW/LHR	CW/LHR
CW/RHR	CW/RHR
CCW/LHR	CCW/LHR
CCW/RHR	CCW/RHR

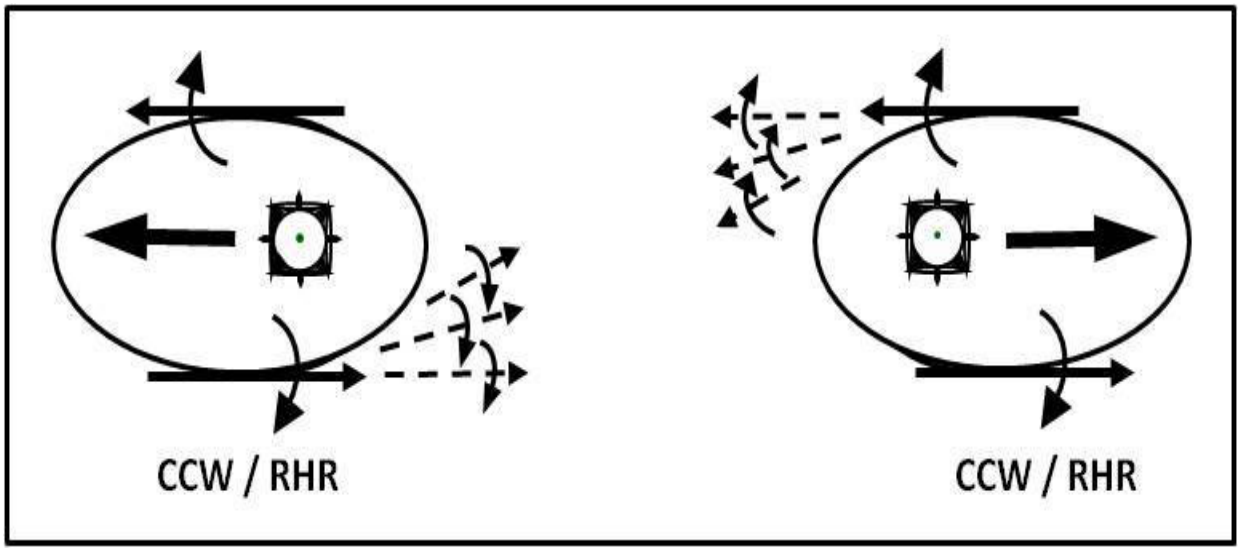
The electrostatic forces generated by the rotation and spin of all the possible similar and dissimilar charge combinations are presented in The Electric Field / Electrostatic Force Analysis section of the APPENDIX: THE ZPE MODEL ELECTRICAL ANALYSES. The similar and dissimilar charge combinations that could satisfy Coulomb's Law, like charges repel and unlike charges attract each other, are shown in the following illustrations. In all cases the electric field generation process occurs at the outer periphery of the charge's charge related free energy element envelope where the free energy elements interact with the surrounding energy aether. The resulting electric field travels through the energy aether by the transmission of spin (rotational) energy primarily and interacts with the charge related free energy elements of the other charge. When the electric field's spin energy is in the same direction as the spin of the charge related free energy element that it impinges upon the free energy element is accelerated in the direction that it is travelling. If the electric field's spin energy is in the opposite direction to that of the charge related free energy element it impinges upon the free energy element is decelerated in the direction it is travelling. The net effect of accelerating / decelerating the charge related free energy elements is the formation of an elliptically shaped envelope with an attendant energy imbalance with respect to the charge's mass / mass energy nucleus. This energy imbalance is responsible for the generation of a force that is

commonly termed the electrostatic force and is shown as a dark bold arrow at the centre of the charge. The electrostatic force generation process occurs at both charges simultaneously and is responsible for the repulsive and attractive forces associated with similar and dissimilar charges.



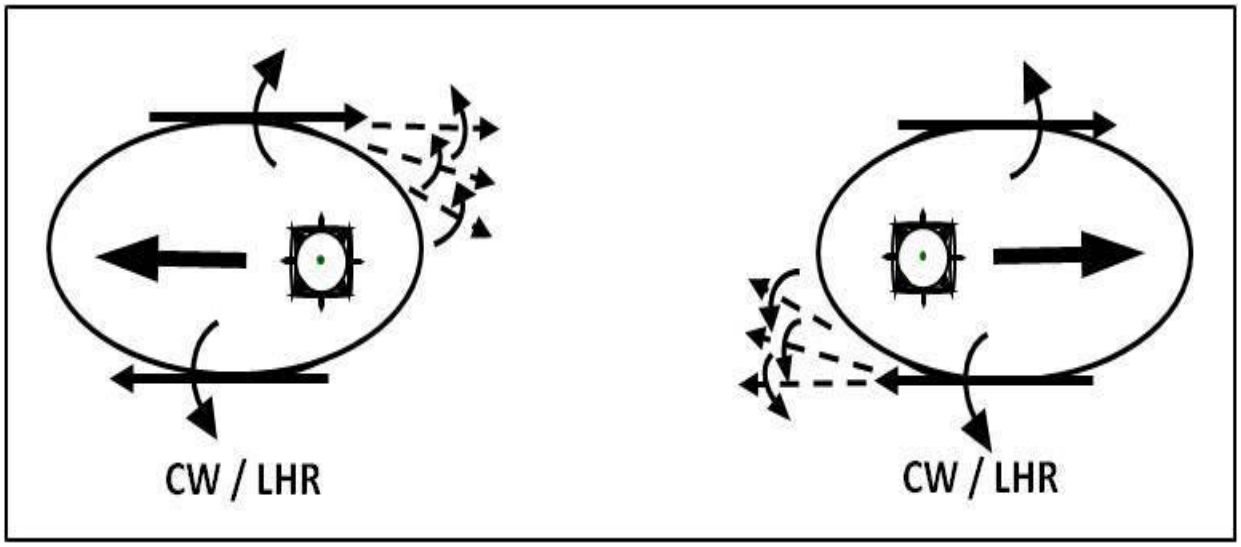
Electric Fields / Electrostatic Forces

(CCW/LHR - CCW/LHR)



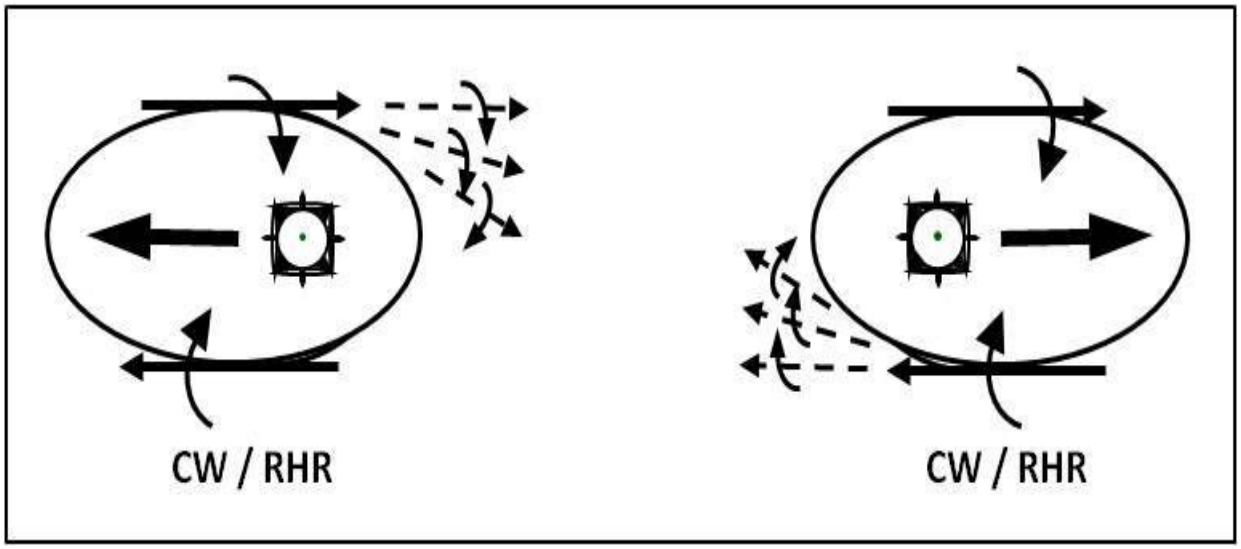
Electric Fields / Electrostatic Forces

(CCW/RHR -CCW/RHR)



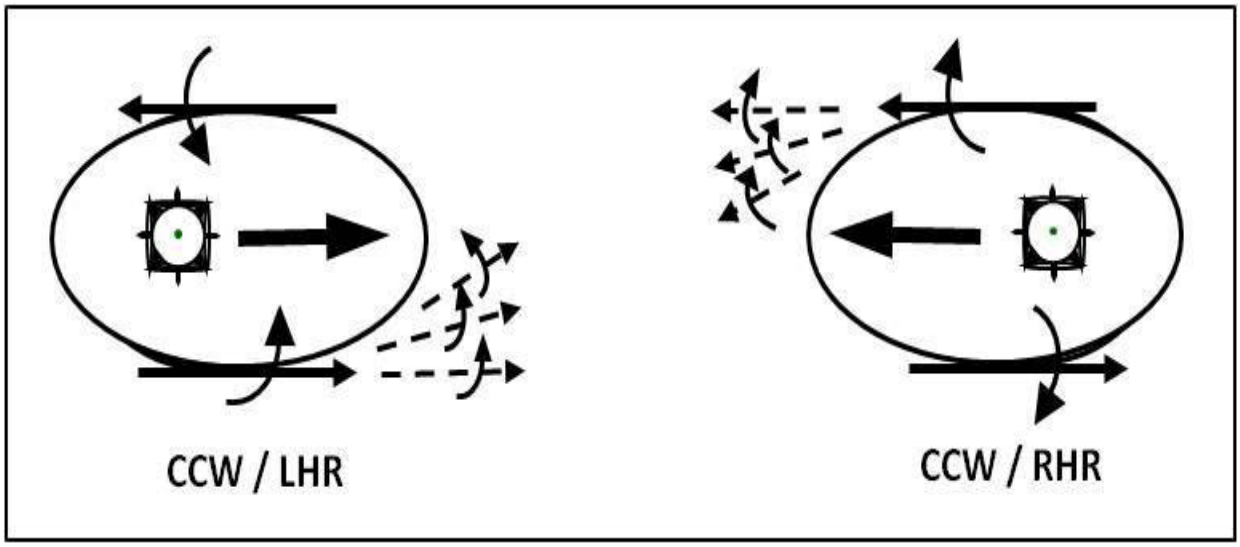
Electric Fields / Electrostatic Forces

(CW/LHR - CW/LHR)



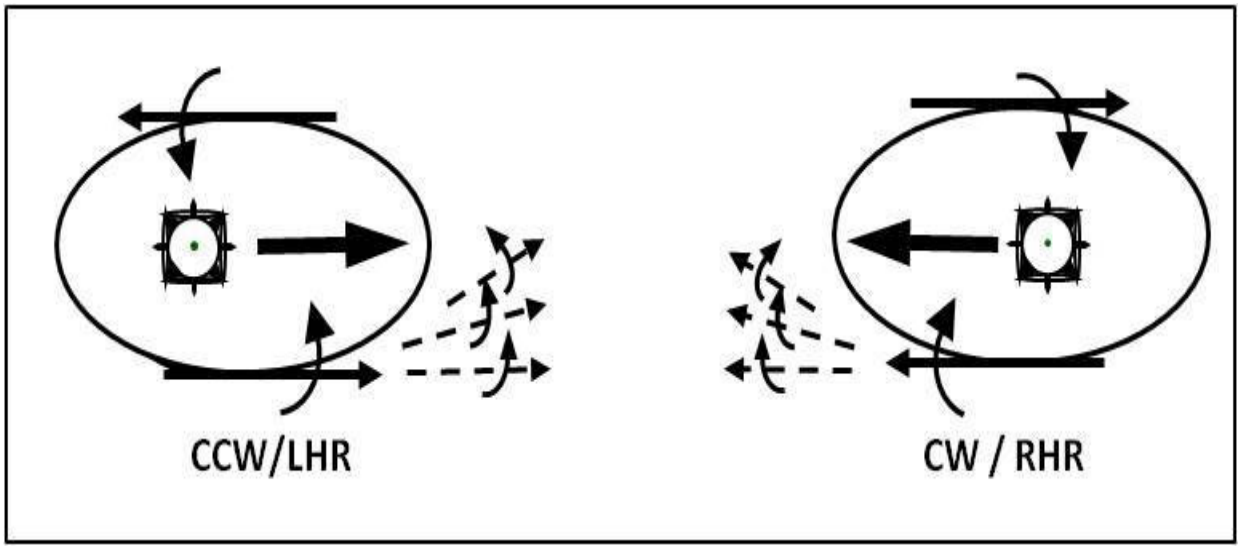
Electric Fields / Electrostatic Forces

(CW/RHR -CW/RHR)



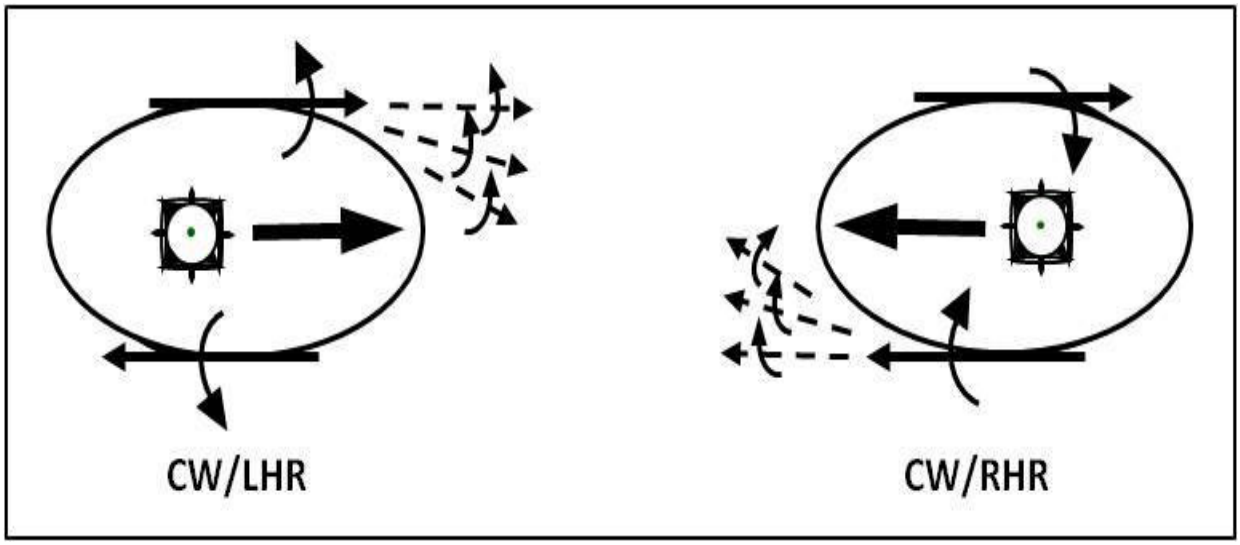
Electric Fields / Electrostatic Forces

(CCW/LHR - CCW/RHR)



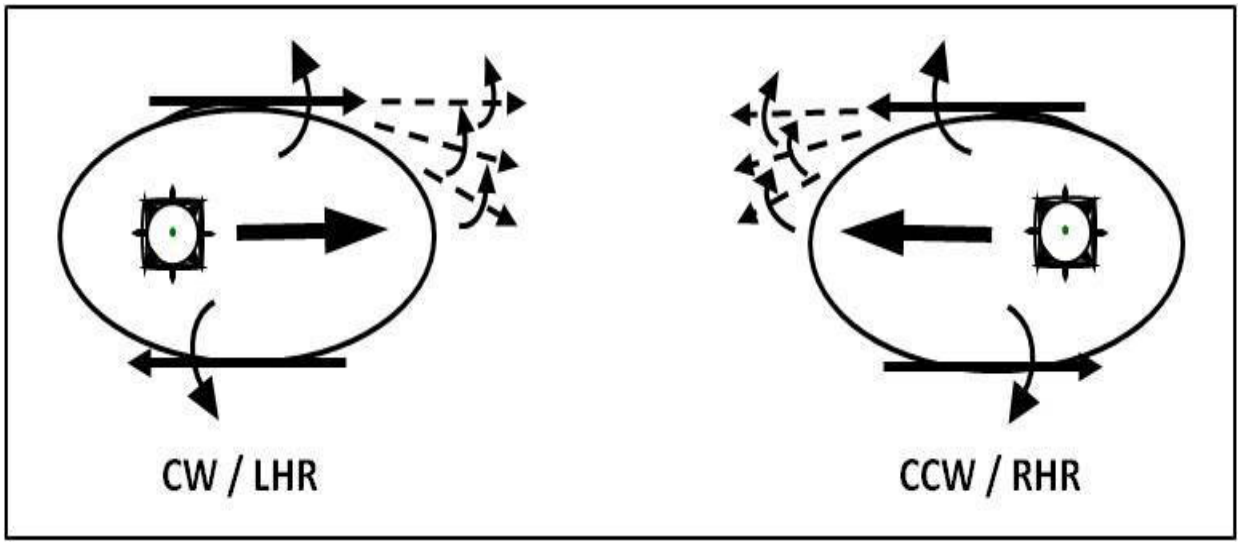
Electric Fields / Electrostatic Forces

(CCW/LHR - CW/RHR)



Electric Fields / Electrostatic Forces

(CW/LHR - CW/RHR)



Electric Fields / Electrostatic Forces

(CW/LHR - CCW/RHR)

The similar charge combinations that could satisfy Coulomb's Law, like charges repel each other, are

>> CCW/LHR - CCW/LHR

>> CCW/RHR - CCW/RHR

>> CW/LHR - CW/LHR

>> CW/RHR - CW/RHR

The dissimilar charge combinations that could satisfy Coulomb's Law, unlike charges attract each other, are

>> CCW/LHR - CCW/RHR

>> CCW/LHR - CW/RHR

>> CW/LHR - CW/RHR

>> CW/LHR - CCW/RHR

Since all the similar charge combinations are valid or generate electrostatic forces repelling them apart, any one of the four dissimilar charge combinations could satisfy Coulomb's Law. Which of the four dissimilar ZPE charge model combinations are valid and which is an electron and which is a proton within the combination must still be determined.

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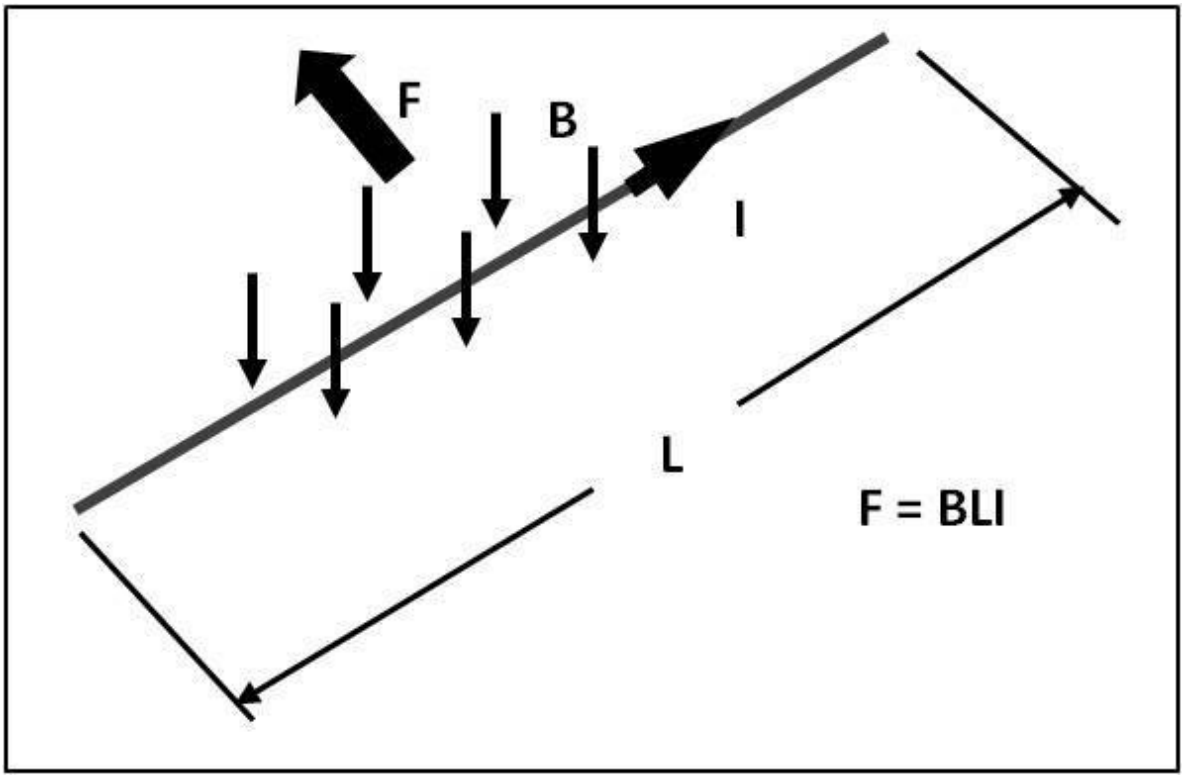
(Electro)magnetic Fields and Forces

The (electro)magnetic field / force generation process is illustrated in the following sketch. The magnitude of the force, F , is defined by the relationship, F = B L I , where, B , is the (electro)magnetic field perpendicular to the current, I , that is travelling along a wire of length, L. The direction of the force is in the direction the palm of the right hand is facing when the thumb is pointed in the direction of the current and the fingers are in the direction of the magnetic field. When the (electro)magnetic field is parallel to the current along the wire the force, F , is zero.



(Electro)magnetic Field / Force Relationship

The ZPE model defines the electron and proton in terms of the orbital direction of travel and spin of their charge related free energy elements, CCW/RHR, CCW/LHR, CW/RHR or CW/LHR. Since the spin associated with the electromagnetic field surrounding an electron moving along a wire would be the same as that for the magnetic field generated by electrons moving within a material, the ZPE model does not differentiate between magnetic and electromagnetic fields and as such the term (electro)magnetic field is used here.

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If the (electro)magnetic field is assumed to have an LHR spin the possible orbital directions of travel and spin combinations defining the electron generating the field is either CW/LHR or CCW/LHR. Similarly, if the field has an RHR spin the possible orbital directions of travel and spin combinations defining the electron generating the (electro)magnetic field is either CW/RHR or CCW/RHR.

When an (electro)magnetic field having an LHR spin is generated by an electron modeled as CW/LHR, the remaining charge models are CW/RHR, CCW/LHR and CCW/RHR and the possible electron-proton combinations are

>> CW/LHR - CW/RHR

>> CW/LHR - CCW/LHR

>> CW/LHR - CCW/RHR

When an (electro)magnetic field having an LHR spin is generated by an electron modeled as CCW/LHR, the remaining charge models are CW/LHR,

CW/RHR and CCW/RHR and the possible electron-proton combinations are

>> CCW/LHR - CW/LHR

>> CCW/LHR - CW/RHR

>> CCW/LHR - CCW/RHR

Any of these six electron-proton charge combinations could satisfy the (electro)magnetic field / force relationship but on comparing these combinations to those that could satisfy Coulomb's Law, the electron-proton charge combinations that could satisfy both the (electro)magnetic field / force and the electric field / electrostatic force relationships are

>> CW/LHR - CW/RHR

>> CW/LHR - CCW/RHR

>> CCW/LHR - CCW/RHR

>> CCW/LHR - CW/RHR

For these four possible electron-proton combinations the charge models with an an LHR spin represent electrons and those with an RHR spin represent protons.

When an (electro)magnetic field having an RHR spin is generated by an electron modeled as CW/RHR, the remaining charge models are CW/LHR, CCW/LHR and CCW/RHR and the possible electron-proton combinations are

>> CW/RHR - CW/LHR

>> CW/RHR - CCW/LHR

>> CW/RHR - CCW/RHR

When an (electro)magnetic field with an RHR spin is generated by an electron modeled as CCW/RHR, the remaining charge models are CW/LHR, CW/RHR and CCW/LHR and the possible electron-proton combinations are

>> CCW/RHR - CW/LHR

>> CCW/RHR - CW/RHR

>> CCW/RHR - CCW/LHR

Any of these six electron-proton combinations could satisfy the (electro)magnetic field / force relationship but comparing these combinations to those that could satisfy Coulomb's Law, the electron-proton charge combinations that could satisfy both the (electro)magnetic field / force and the electric field / electrostatic force relationships are

>> CW/RHR - CW/LHR

>> CW/RHR - CCW/LHR

>> CCW/RHR - CW/LHR

>> CCW/RHR - CCW/LHR

For these four possible electron-proton combinations the charge models with an RHR spin represent electrons and those with an LHR spin represent protons.

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In summary, eight possible electron-proton combinations that could satisfy both Coulomb's Law and the (electro)magnetic field / force relationship have been defined. That is, when the (electro)magnetic field has an LHR spin the charge models with an LHR spin within the following electron-proton combinations represent an electron and those with an RHR spin a proton.

>> CW/LHR - CW/RHR

>> CW/LHR - CCW/RHR

>> CCW/LHR - CCW/RHR

>> CCW/LHR - CW/RHR

When the (electro)magnetic field has an RHR spin the charge models with an RHR spin within the following electron-proton combinations represent an electron and those with an LHR spin a proton.

>> CW/RHR - CW/LHR

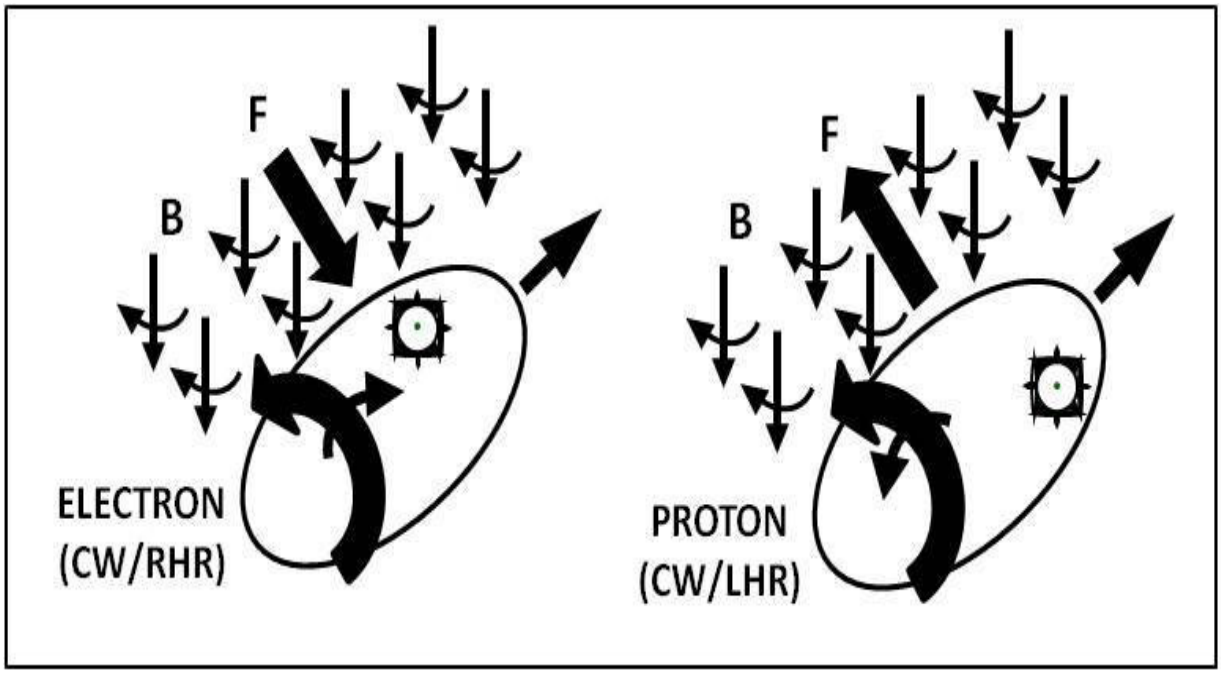
>> CW/RHR - CCW/LHR

>> CCW/RHR - CW/LHR

>> CCW/RHR - CCW/LHR

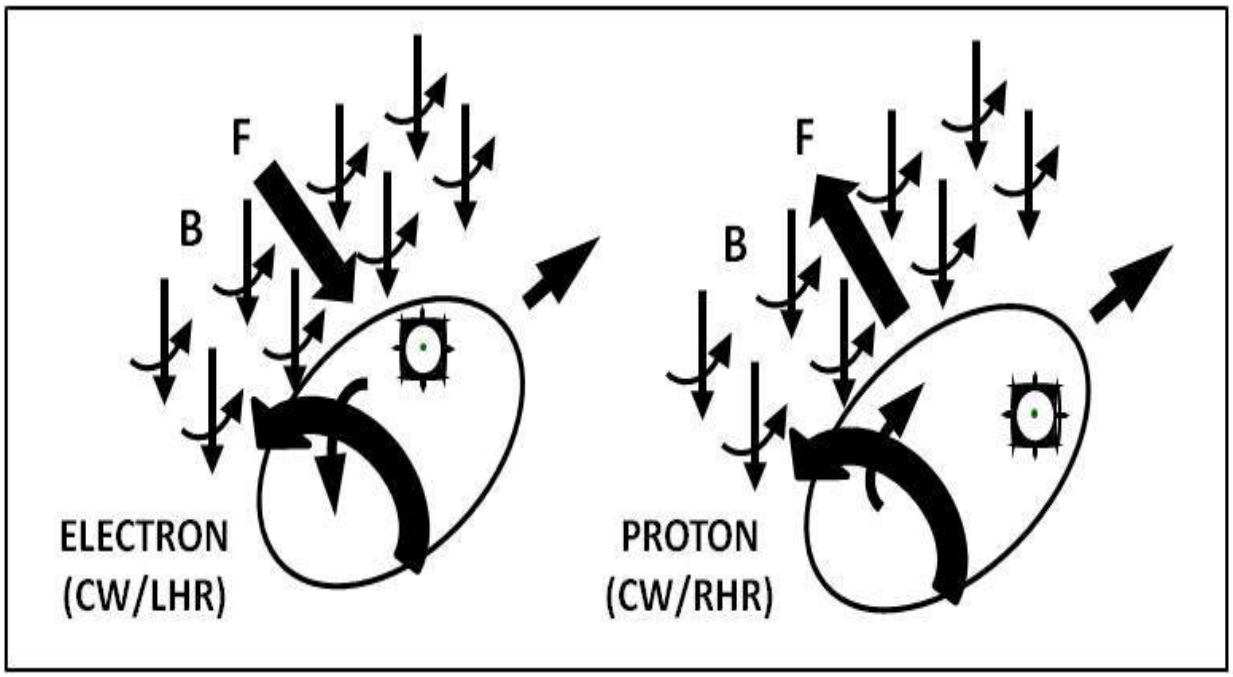
These eight electron-proton combinations are analyzed in the The (Electro)magnetic Field / Force Analysis section of the APPENDIX: THE ZPE MODEL ELECTRICAL ANALYSES. The electron-proton combinations that satisfy both Coulomb's Law and the (electro)magnetic field / force relationships are presented in the following illustrations. When the field's spin complements the spin of the charge related free energy elements making up the charge's electromagnetic field, the charge related

free energy elements are accelerated in the direction they are moving and vice versa if the opposite is the case. The acceleration / deceleration process distorts the charge related free energy envelope about its direction of movement causing an energy imbalance or a force (bold black arrow) to be generated that is perpendicular to the charge's movement and the field. It should be noted that the electromagnetic field, which is basically a net rotation of the charge related free energy elements about a moving charge, is assumed to shift the imbalance caused by the field by ninety degrees in the direction of rotation of the charge's electromagnetic field. The charge's mass is at the leading edge of the charge related free energy envelope because of the interaction of a moving charge's charge related free energy elements with the surrounding energy aether.



Electron(CW/RHR) - Proton(CW/LHR)

Field(RHR) / Force



Electron(CW/LHR) - Proton(CW/RHR)

Field(LHR) / Force

When the field, B, is parallel to the charge's direction of movement the electromagnetic field surrounding the charge, although distorted, remains rotationally balanced about the charge's direction of movement. As a consequence there is no transverse force being generated, F = B L I = 0 .

In concluding, the (electro)magnetic field and electron and proton combinations that could satisfy the (electro)magnetic field / force relationship, F = B L I , and Coulomb's Law, F = k q1 q2 / r**2 , are

>> (Electro)magnetic Field (LHR) / Electron (CW/LHR) - Proton (CW/RHR) and

>> (Electro)magnetic Field (RHR) / Electron (CW/RHR) - Proton (CW/LHR).

Since the orbital rotation of the charge related free energy elements defining an electron and proton are the same, clockwise (CW), the ZPE model of the electron and proton can be completed when the spin of either the electron or proton's charge related free energy elements are known. The (electro)magnetic field's spin would be the same as that for the electron's charge related free energy elements.

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Antigravity

The ZPE model interprets electrostatic force as an energy imbalance arising from an electric field interacting with the charge's charge related free energy elements causing them to assume an elliptically shaped orbit. As the electric field increases in intensity the path taken by the free energy elements becomes more elongated and susceptible to disturbance(s) of an electrical and/or mechanical nature. These disturbance(s) are believed to cause the charge related free energy elements to form a rotating vortex about the charge related free energy envelope's major axis. This configuration, which is similar in nature to the outward facing vortices that generate the gravity field described for the ZPE model of the neutron (mass), generates a gravity-like field that ultimately interacts with mass to yield a gravity-like force. The rotating vortex of charge related free energy elements around a charge is considered here to be the key to antigravity and it is not just limited to high differential voltages. It could be the result of any operating condition, electrical, mechanical and/or electromechanical, that manipulates the charge related free energy envelope surrounding a charge (electron) into a rotating vortex of free energy elements.

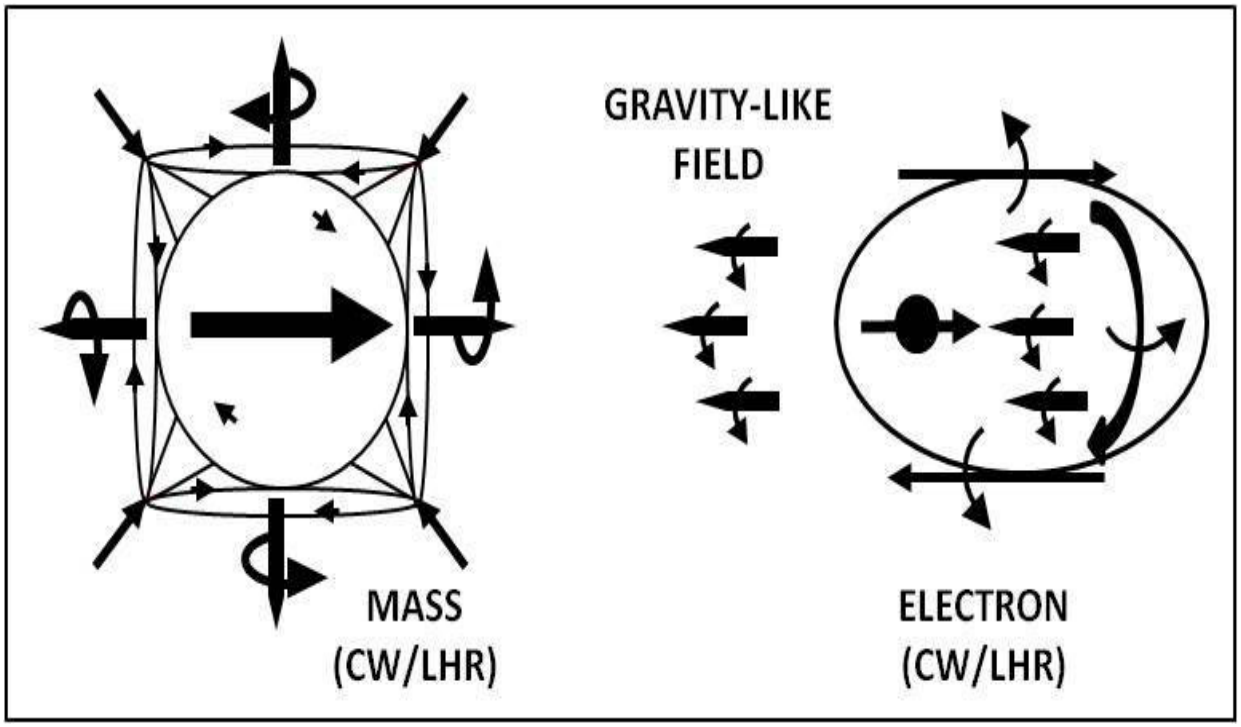
The ZPE models for mass were determined as either CCW/RHR or CW/LHR. The mass-electron model combinations that could yield an attractive force for these two possible ZPE models of mass are either

>> Mass, CCW/RHR; (electro)magnetic Field (RHR) / electron (CW/RHR) - proton (CW/LHR)

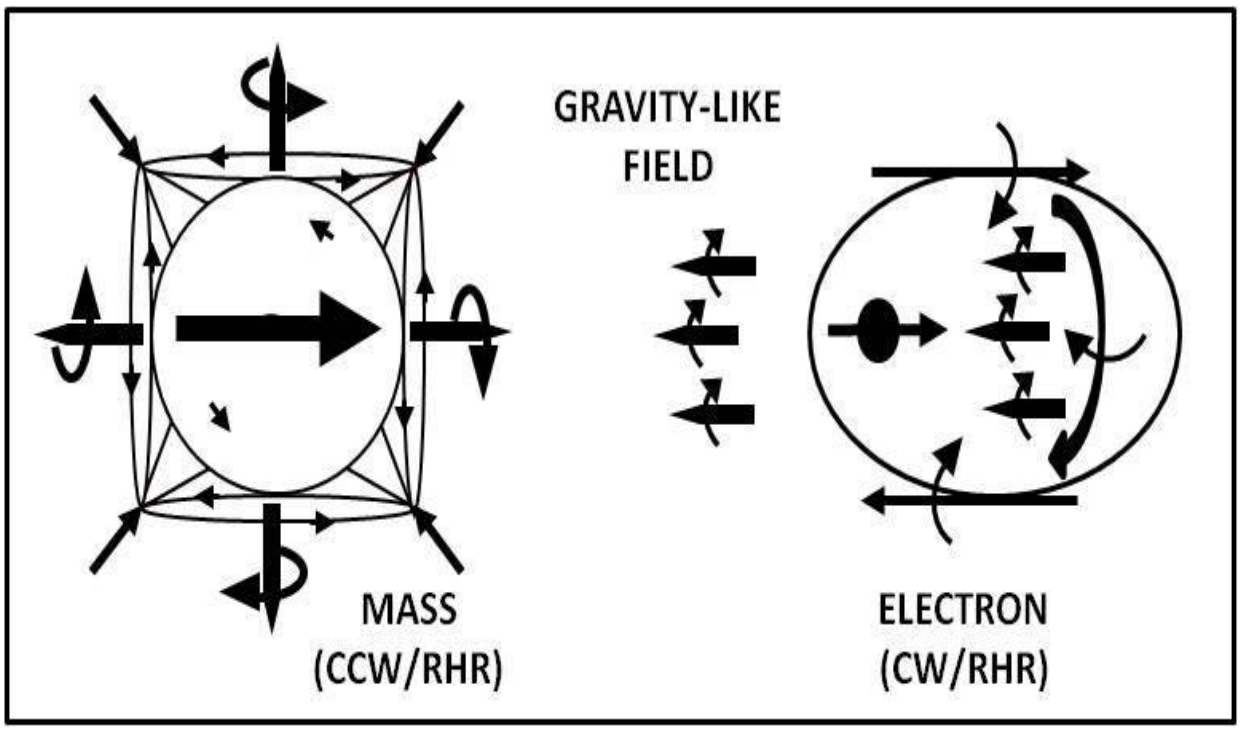
or

>> Mass, CW/LHR; (electro)magnetic Field (LHR) / electron (CW/LHR) - proton (CW/RHR).

The following two illustrations show the gravity-like field generated by the electron's charge related free energy element vortex interacting with the electron's mass and the mass in the immediate vicinity of the electron to generate an attractive force that is depicted by the arrows at the centre of the mass and the electron's mass.

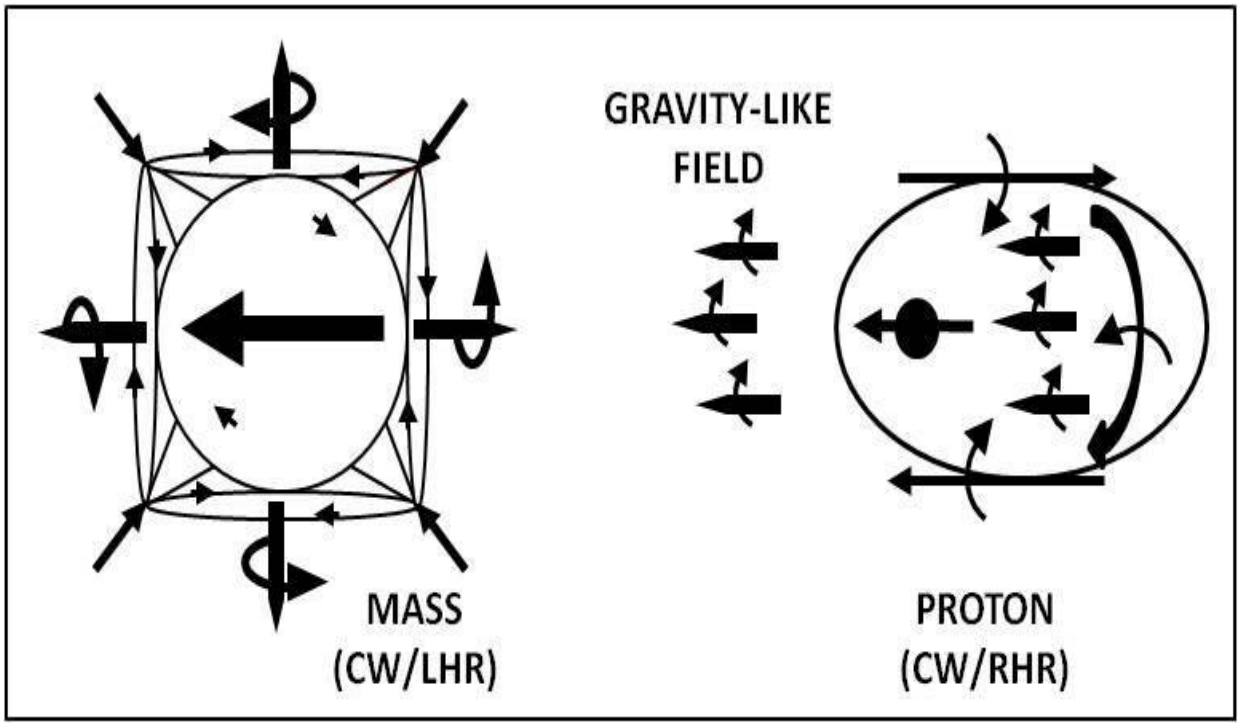


Mass (CW/LHR) - Electron (CW/LHR)

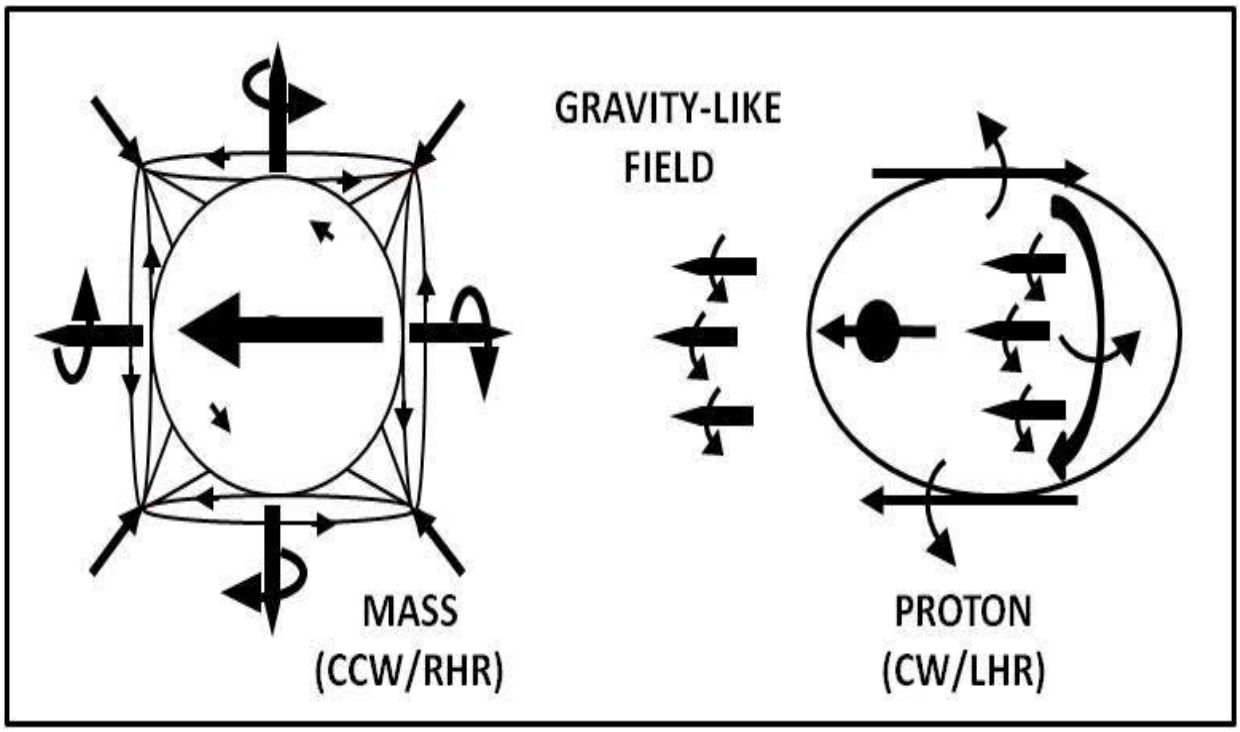


Mass (CCW/RHR) - Electron (CW/RHR)

The antigravity phenomenon is described here in terms of the ZPE mass-electron interaction because experiments indicate that this is what is occurring. However, for the sake of completeness the following two illustrations show the gravity-like field generated by the proton's charge related free energy element vortex interacting with the proton's mass and the mass in the immediate vicinity of the proton to generate a repulsive force depicted by the arrows at the centre of the mass and the proton's mass.



Mass (CW/LHR) - Proton (CW/RHR)



Mass (CCW/RHR) - Proton (CW/LHR)

Protons are of limited interest to the generation of a gravity-like field / force but they do introduce one interesting and thought provoking possibility. That is, the nucleus of an atom consists of neutrons and protons and since like charges repel each other the nucleus should simply fly apart. It doesn't, and if one assumes that the protons associated with an atom's nucleus are on the outer periphery of the nucleus and generating a gravity-like field / force, the neutrons and protons themselves are forced inwards keeping the atom's nucleus intact. This could be an explanation for what is termed the "strong nuclear force" and presented to mainstream scientists for comment. However, it should be kept in mind that there is a more important underlying question that should also be addressed. That is, with our present understanding and attitudes to the antigravity phenomenon, could the generation of a gravity-like field / force occur naturally without our intervention or awareness of its existence?

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Closing Remarks

Our limited understanding of mainstream science's basic mechanical and electrical laws coupled with the confusingly disjointed claims and reports made by antigravity researchers indicates that something is amiss with regard to our understanding of both mainstream science and antigravity. This led to the development of the ZPE model. The ZPE model assumes the existence of a zero point energy environment or aeather comprised of energy elements that can coalesce to form both stable and unstable concentrations of energy and act as a medium through which electric, (electro)magnetic and gravity waves travel.

The ZPE model describes mass and charge (electron and proton), mainstream science's most basic mechanical and electrical field / force generation processes including gravity and antigravity in terms of energy. The model for mass consists of a periphery of outward facing free energy element vortices that are in a self adaptive equilibrium with the surrounding zero point energy environment. The ZPE model for charge, the electron and proton, is defined by the orbital direction of travel and spin of the charge's charge related free energy elements orbiting its mass. The charge and mass models that could satisfy Coulomb's Law, F = k q1 q2 / r**2 , the (electro)magnetic field / force relationship, F = B L I, Newton's Law of Universal Gravitation, F = G m1 m2 / r**2 , and antigravity can be either

>> Mass, CCW/RHR; (electro)magnetic Field (RHR) / electron (CW/RHR) - proton (CW/LHR)

or

>> Mass, CW/LHR; (electro)magnetic Field (LHR) / electron (CW/LHR) - proton (CW/RHR).

Which of these two possible ZPE model combinations relating mass and electricity has been left for future model development initiatives.

The ZPE model, although conceptual in nature and still requiring further development and experimental validation, addresses two very important and immediate issues with respect to antigravity research. It offers a rationale linking mass and electricity that could explain antigravity and challenges our understanding of mainstream science's most basic mechanical and electrical laws.

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ANTIGRAVITY DEVICES / MACHINES

and

NATURAL PHENOMENA

Antigravity or the generation of a gravity-like field / force could involve high voltages or a high (dc) voltage with a time variant component or electric and electromagnetic field interactions or movement of highly charged surfaces or various combinations of these. Also, there are antigravity devices / machines that simply involve rotating a solid mass at high speed, or in the case of a fluid, generating a spiral like rotational movement. To gain insight into these gravity-like field / force generation processes experimental investigations were conducted with the axial convergent capacitor. The results led to The Antigravity (Electrogravitic) Hypothesis and the realization that the claims and reports made by the various antigravity researchers have to be revisited with the purpose of finding a common explanation for their electrical, electromchanical and mechanical devices / machines. After much deliberation a review of mainstream science's time tested laws and relationships that would most likely be associated with antigravity was completed. These laws and relationships, although correct, are really "black box" mathematical representations of physical entities (mass and charge) and the various field / force generation processes associated with them. That is, it isn't the veracity of these laws and relationships that should be questioned but our understanding or interpretation of them. The realization of this led to the development of the Zero Point Energy (ZPE) model to explain mainstream science's basic mechanical and electrical laws and antigravity from a physical perspective. The ZPE model, although conceptual in nature and requiring further development, offers a new and unique interpretation of antigravity that is used here to explain the operation of the different antigravity devices / machines and some natural phenomena that appear to exhibit antigravity or gravity-like field / force characteristics.

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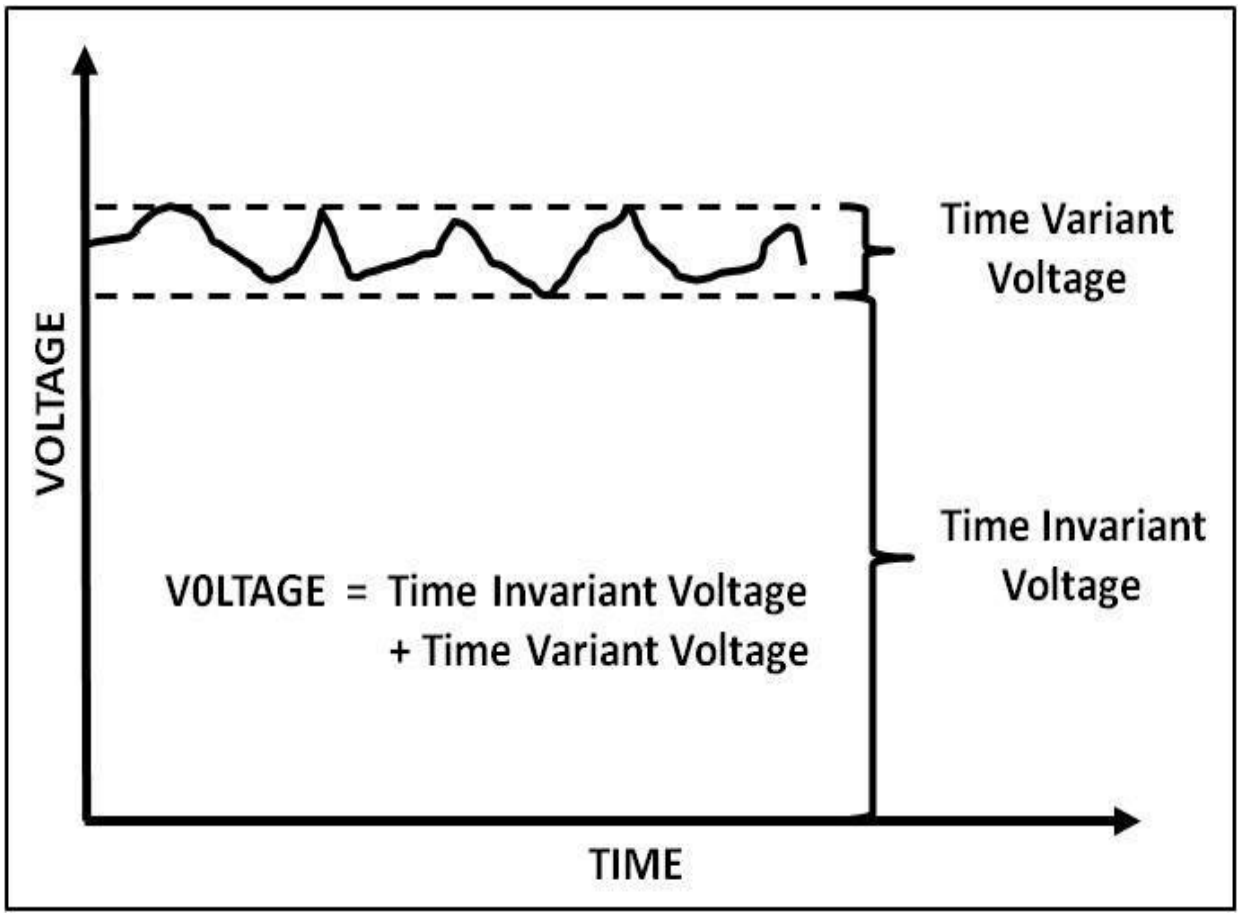
Electrical Devices and Machines

A significant amount of antigravity research is based on T.T. Brown's work with capacitors operating at very high voltages. The geometry of these capacitors ranged from a flat plate capacitor (gravitator) to more complex curved plate arrangements. Brown's claim that a capacitor operating at high voltages can generate an antigravity propulsive force has been confirmed and expanded upon by a host of antigravity researchers investigating this phenomenon. Also noted by Brown and other researchers was that the force generating characteristics of these devices are enhanced when large and rapid changes in voltage are involved. This operating characteristic gives rise to the question as to whether or not antigravity is the result of a steady state time invariant (dc) voltage as suggested or stated by all the researchers or a steady state time invariant (dc) and time variant voltage.

As shown in the following illustration the time variant component of a high voltage power supply's output is usually a small percentage of its time invariant component. A consequence of this is that researchers typically quote a power supply's average or nominal (dc) output operating voltage, nothing else. Base on reports that the generation of a gravity-like field / force by a capacitor type antigravity device is enhanced by large and rapid variations in applied voltage and the experience gained from the axial convergent capacitor's high voltage investigations the position taken here will be to assume that in all cases a time variant voltage component is associated with the power supply's output voltage unless the researcher specifically states otherwise.



Typical Power Supply

Output Voltage Characteristics

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The power supply for the high voltage experiments with the axial convergent capacitor had a significant voltage ripple or time variant voltage. When the significance of the time variant component of input voltage on the axial convergent capacitor's gravity-like field / force generation characteristics became apparent attention focussed on a series of low voltage frequency response experiments. These experiments used a closely controlled 100 volt

sinusoidal input voltage with a mean voltage of 0 volts. The results from the frequency response experiments with the axial convergent capacitor were as follows.

>> The capacitor did not generate a significant force during the frequency response experiments.

>> The axial convergent capacitor's capacitance was 20 picofarads throughout all the frequency response experiments.

>> The electrical connections to the axial convergent capacitor can be reversed without noticeably affecting the frequency response test results.

>> The axial convergent capacitor is an electrical capacitor in series with an electrical resistance effect that can vary several megohms when the magnitude of the resistor in series with the axial convergent capacitor is changed.

An analysis of the high and low voltage experimental results led to the Electrogravitic (EG) Hypothesis and ultimately the development of the ZPE model. The following explanation, which is based on the ZPE model, is offered to explain the axial convergent capacitor's unusual operating characteristics.

The ZPE model states that an electron's charge related free energy envelope, when subjected to an electric field or differential voltage across the capacitor's curved and wire plates, assumes an elliptical shape with its major axis parallel to the field or perpendicular to the wire plate. When the voltage across the axial convergent capacitor's curved and wire plate changes the electric field changes and the electrons move over the surface of the wire plate. As the electrons flow around the circumference and along the length of the wire plate this movement forces their charge related free energy elements to rotate about the major axis of their charge related free energy envelope to cause the generation of a gravity-like field. The gravity-like field interacts with the mass of the electron to generate a force impeding its

movement, a virtual electrical resistance, and the capacitor's materials of construction to generate a gravity-like force or antigravity. The intensifier wire has a major influence on the rotational movement characteristics of the electrons on the wire plate and hence the gravity-like field / force generating characteristics of the axial convergent capacitor.

The axial convergent capacitor experiments, in their entirety, showed that the field / force generation characteristics of the axial convergent capacitor changed when it came near a dielectric other than air. This effect was attributed to changes in the characteristics of the electric field in the immediate vicinity of the capacitor's wire plate. Also, the capacitor's field / force generation characteristics could be detrimentally affected, even destroyed, when an electric current other than that associated with the normal operation of the capacitor flows through the wire plate. This further supports the claim that the movement of the electrons around and along the wire plate is a key factor in the axial convergent capacitor's ability to generate a gravity-like field / force. The capacitor's memory characteristics are considered to be a side effect of the gravity-like field having material related consequences that go beyond just generating a force. Finally, the experimental investigations with the axial convergent capacitor suggest that the movement of electrons around the circumference and length of the wire plate to generate a gravity-like field / force is limited to a range of operating conditions dictated by the geometry of the axial convergent capacitor.

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T.T. Brown, in his paper "How I Control Gravitation" Science and Invention, August 1929, describes his gravitator as a dielectric with two plates at either end suspended by wires in an oil bath. When a high differential voltage is applied across the plates the gravitator swings from its rest (uncharged) position and over the following 55 seconds slowly returns to its rest position still fully charged. Brown's gravitator experiments showed an unexpected

sensitivity to gravitational fields of extraterrestrial origins that were in alignment with the gravitator. They also showed that the large and rapid changes in the differential voltage when the gravitator plates are being charged have a major effect on the gravity-like force generated by the gravitator. He offers no explanation for these experimental results or the extraterrestrial gravitational effects on the operating characteristics of the gravitator.

The following hypothesis, which is based on the ZPE model, is presented to explain the gravitator's unusual operating characteristics. When the differential voltage is applied across the gravitator's plates the charge related free energy envelope associated with the charges on the plates assume an elliptical configuration according to the ZPE model. At the same time that this is occurring the electrons on the surface of the plates move causing their charge related free energy elements to rotate about the major axis of their charge related free energy envelope. This rotational movement generates a gravity-like field which interacts with the mass of the gravitator's dielectric and plates to generate an impulse force that causes its initial swing. After the gravitator is charged to the applied differential voltage, charge movement on the plates subsides and extraterrestrial gravitational effects having a component in alignment with the gravitator becomes a more dominant effect. These gravitational effects alter the gravity-like field generation process and the resultant gravity-like force being generated as the gravitator returns to its rest position.

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E.J. Saxl's electrically charged torque pendulum (Nature, Vol. 203, No. 4941, pp 136 - 138, July 1964) was designed to accurately determine earth's acceleration of gravity, g. After thousands of observations over the period of a decade it was found that the electrically charged torque pendulum exhibited the following operating characteristics.

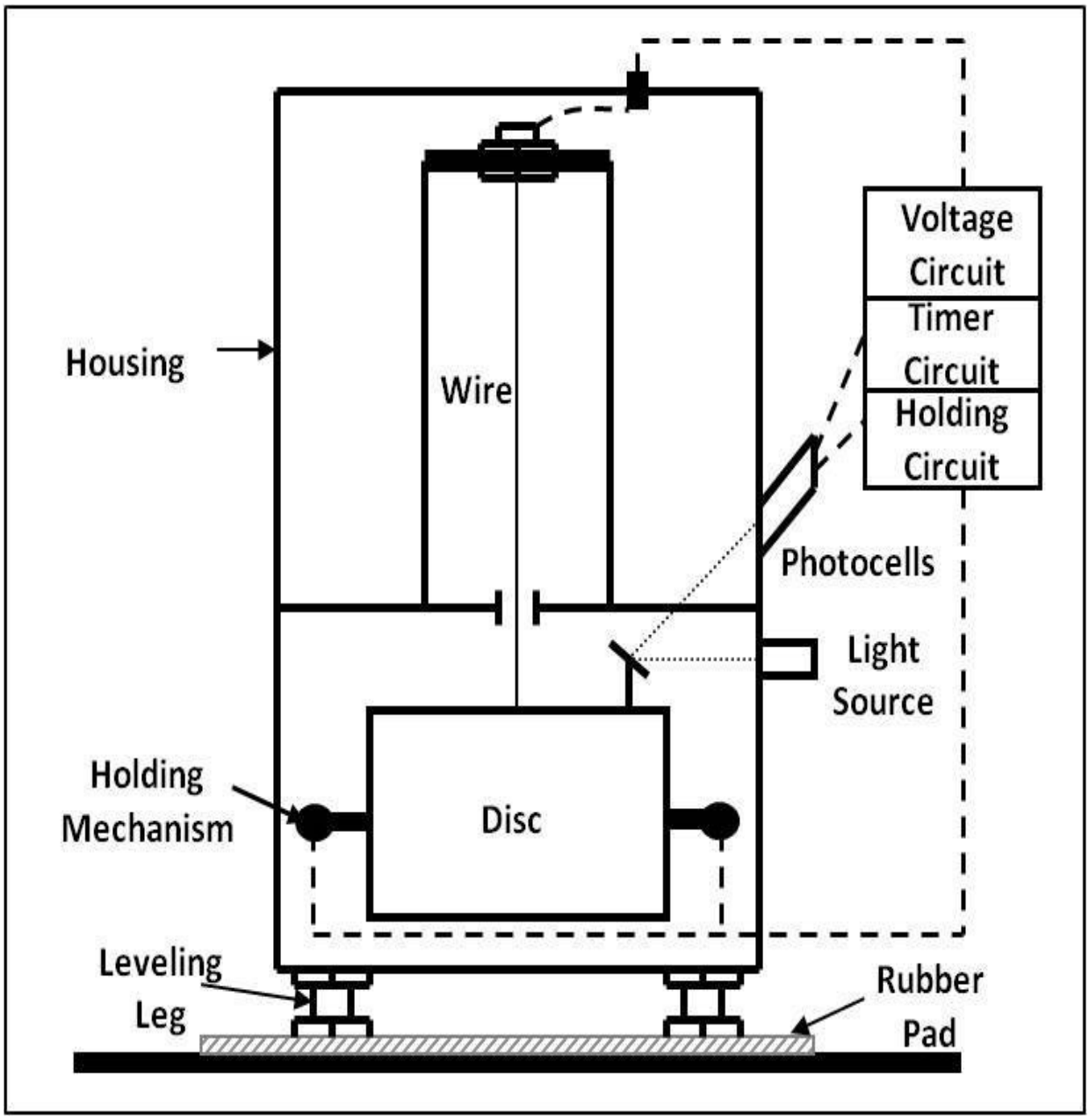
>> The pendulum's period of oscillation increased with the voltage applied to the pendulum and surrounding housing. A positive voltage caused the pendulum to rotate slower than a negative voltage of the same magnitude. A grounded electric torque pendulum (zero voltage) rotated the fastest.

>> Diurnal as well as seasonal variations could be detected and solar and lunar eclipses were particularly noticeable.

>> Electrical disturbances during and preceding earthquakes, volcanic eruptions and hurricanes were noted.

No explanation is offered for these experimental results.

An abbreviated description of the electrically charged torque pendulum and its operation is presented as background to the hypothesis that is offered here to explain these experimental results. As shown in the following illustration Saxl's electrically charged torque pendulum consists of a horizontal disc suspended from a small diameter wire that is surrounded by and electrically connected to a housing. The pendulum and its metal housing are on four leveling legs that are electrically insulated from the supporting structure by a rubber pad. The pendulum housing and pendulum can be grounded or at some high positive or negative voltage for each oscillation cycle. The voltage control circuit controls the magnitude and sequencing of the voltage applied to the housing and pendulum disc. A typical operating cycle would involve de-energizing the holding mechanism to release the disc and begin the oscillation cycle. A photoelectric cell senses the position of the pendulum and starts the pendulum's timer circuit. The disc rotates about 150 degrees and then returns to have its position sensed again. At this point the timer is stopped and the holding circuit energizes the disc's holding mechanism. The acceleration of gravity is determined from the timer data and the pendulum's design parameters which include the mass and radius of the disc and the length and torsional constant of the suspension wire.



Electrically Charged Torque Pendulum

(Adapted from United States Patent No. 3 357 253)

The fact that the electrically charged torque pendulum's movement characteristics are sensitive to earth's gravitational field shouldn't be too

surprising. After all, it was designed and built to measure the earth's gravitational field. What is surprising is that these measurements are to a much lesser extent influenced by the gravitational fields of an extraterrestrial nature, electrical disturbances in its environment and geophysical events. What is even more surprising is that this sensitivity is enhanced when a positive or negative voltage is applied to the pendulum and the housing surrounding it.

The ZPE model, a conceptual model linking mainstream science to antigravity phenomena, interprets the electrically charged torque pendulum's unusual operating characteristics as follows. When the pendulum's disc and housing are charged to the same positive or negative voltage the charge related free energy envelope surrounding the charges on the pendulum disc's surface and housing assume an elliptical shape as per the ZPE model. The disc's rotational movement causes the charge related free energy elements to rotate about the charge related free energy envelope's major axis and generate a gravity-like field. Since the velocity of the disc's surface is continuously changing in both magnitude and direction the gravity-like field that is being generated would also be continuously changing. The net result of this is the generation of a gravity-like force that is changing with velocity in both magnitude and direction but always impeding the movement of the disc to cause the pendulum's period of oscillation to increase. When the disc and housing are at zero voltage the charges on the disc's surface have a spherically shaped charge related free energy envelope and the ability of this configuration to generate a gravity-like field / force is minimal. Hence, the pendulum's period of oscillation is the shortest when compared to either a negatively or positively charged housing and pendulum.

The device's sensitivity to gravitational fields other than earth's arises from the interaction of these extraterrestrial gravitational fields with the field generating process on the surface of the disc and ultimately the interaction of this gravity-like field with the mass of the disc to generate the impeding force. Since gravity-like fields are considered to be similar in nature to

gravitational fields this would also apply to any gravity-like field being generated by electrical or geophysical events.

In summary, the voltage applied to the pendulum disc and housing combined with the disc's rotational movement generate a gravity-like field on the surface of the pendulum disc. This field generation process is affected by extraterrestrial gravitational fields and gravity-like fields generated by earth related electrical and geophysical events. The resultant field that is generated on the disc's surface interacts with the disc's mass to impede its movement or increase its period of oscillation.

******

J.R.R. Searl's antigravity claims regarding his levity disc, a segmented disc (basically a gear with spokes) rotating in an electromagnetic field, are truly astounding. Searl with the help of associates built several of these discs that simply flew away and were lost during demonstrations and experiments. The following phenomena were observed during the course of these investigations.

>> Antigravity or levity of the entire machine.

>> Electrostatic fields that were estimated to be in the 10**5 to 10**13 volt range.

>> Peculiar magnetic fields. The magnetic field from the generator produced induction in conductive loops when there was no relative movement.

>> Perpetual motion. After a threshold potential (of about 10**13 volts) is exceeded energy output exceeds energy input (by about 10**13 to 10**15 watts).

>> Loss of inertia. The generator and attached parts become inertia free after the threshold voltage (about 10**13 volts) is exceeded.

>> Flight control. By altering the distribution of potential on the surface of the craft it is possible to propel it in different directions.

>> Ionization of air. The high voltages being produced caused the surrounding air to be ionized.

>> Electric polarity. Searl felt a cobweb sensation on his skin after working near the levity disc and his clothes and bed linen clung to him.

>> Matter snatch. When the power is suddenly switched on, the craft takes a lump of the ground that it was resting on as it rises up.

These observations and test results remain unexplained.

The ZPE model interprets the operation of Searl's levity disc as follows. The segmented disc is driven by a motor at an angular velocity (w) but the disc's tangential velocity (v = w r) varies from zero at its centre (r = 0) to a maximum at its circumferential radius. When an electron at the outer periphery of the disc segment is forced to cut across the magnetic field its charge related free energy element envelope is altered to generate a force countering the disc's angular velocity as they are propelled axially. This readjustment of the charge related envelope causes the electron to rotate around the edge(s) of the disc segment, and as in the case of the axial convergent capacitor, generate a gravity-like field that leads to antigravity when it interacts with the machine's materials of construction. The gravity-like field being generated by the levity disc is considered to be of sufficient strength to alter material and mass (mass energy) characteristics to realize the various unexplained phenomena that have been observed.

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Mechanical Devices and Machines

There is a class of antigravity devices / machines involving just mass movement, no electrical requirements. As can be expected the claims and reports associated with these devices / machines have caused considerable confusion, even disbelief, among mainstream scientists, engineers and even antigravity researchers. The antigravity researchers investigating and developing these moving mass devices / machines include Sandy Kidd, Eric Laithwaite, William Dawson, H.J. Wallace and Viktor Schauberger.

>> Viktor Schauberger demonstrated that unique swirling movements of air can generate antigravity forces of sufficient strength to levitate and propel a machine, the Repulsin.

>> H.J. Wallace created what could be considered a gravity-like field / force based on the high speed rotation of mass(es) (United States Patents No. 3 626 605 and 3 626 606).

>> British Aerospace confirmed that Sandy Kidd's gyro based antigravity machine does in fact produce a small weight change.

>> Eric Roberts Laithwaite and William Dawson have demonstrated that a solid mass rotating at gyroscopic speeds and subjected to forced precession can generate an antigravity force (Laithwaite, Eric and Dawson, William, "Propulsion System", United States Patent No. 5 860 317, January, 1999).

The ZPE model explains the antigravity phenomena associated with these mechanical devices / machines as follows.

The nucleus of an atom or the nuclei of a molecule is surrounded by orbiting electrons. Their orbital path and the general shape of the charge

related free energy envelope surrounding these electrons is dependent upon their interaction with the atom or molecule they are part of and the energy aeather in which they are travelling. The path of these electrons can be altered by electric and (electro)magnetic fields and by rotation of the material itself. The latter is of concern here. The ZPE model suggests that the material's rotational movement causes the charge related free energy envelope surrounding the orbiting electrons to form a rotating vortex-like configuration that generates a gravity-like field. This field ultimately interacts with the the device / machine's material to generate a gravity-like propulsive force, antigravity. This antigravity field / force generation process, although still dependent upon the vortex-like configuration of an electron's charge related free energy envelope, would be dependent upon the atomic structure of the material and its movement characteristics (rotation, forced precession, ...).

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Natural Phenomena

The gravity-like field / force generation process can be associated with electrical conditions and / or mechanical movement. The interaction of electric and (electro)magnetic fields (The Hutchison Effect) can also generate a gravity-like field. In all cases it is assumed that this phenomenon can only be manmade. Granted, it is difficult to establish the conditions that will generate the phenomenon but to assume it is impossible any other way is just going too far. This section briefly comments on what is believed to be naturally occurring gravity-like field / force phenomena.

T.T. Brown claimed that his gravitator was sensitive to gravitational influences produced by the moon and sun with much smaller variations produced by different planets. E.J. Saxl went a step further when he claimed that in addition to terrestrial and extraterrestrial gravitational influences his electrically charged torque pendulum's period was also sensitive to electrical disturbances prior to and during earthquakes, volcanic eruptions and electrical activity such as thunderstorms. He goes further to suggest that a research program be initiated to investigate this phenomenon in the hopes of developing a means of predicting impending and potentially catastrophic geophysical events. Considering the scope of his investigations and the fact that Sandy Kidd, Eric Roberts Laithwaite, H.J. Wallace and Viktor Schauberger have demonstrated that a gravity-like field / force can be generated by just rotating a material, liquid or solid, it is not unreasonable to suggest that material movement within the earth as well as electrical activity on the earth's surface may be responsible for generating a gravity-like field.

Reports of geographic locations where gravity is seemingly altered in some manner have persisted throughout history. If the location is associated with some easily recognized topographical feature such as a hill, names like

Gravity Hill, Magnetic Hill or Mysterious Hill are not uncommon. If the anomaly is perceived to have a spirit dimension names like Ghost Hill or Spook Hill are likely. Explanations for the observed anomaly at places like these and other locations such as the Cosmos (Black Hills, South Dakota) where trees are growing out the side of a hill at an angle to vertical is that it is an optical illusion and/or a gravitational anomaly. It is suggested that these types of locations be investigated with the hypothesis that what is being observed is a gravity-like field in combination with the earth's gravitational field. This research would raise interest in monitoring geophysical phenomena that could lead to a better understanding and prediction of natural events such as earthquakes with the intent of mitigating the death and destruction usually associated with them. Saxl's electrically charged torque pendulum is an obvious choice for geophysical studies of this nature. When the phenomenon is relatively stable and ongoing an accurate level survey in the immediate vicinity of the site and at the site itself might also provide useful information.

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Although the ZPE model is conceptual in nature and must still be experimentally validated, it has, if nothing else, challenged us to better understand mainstream science's basic mechanical and electrical laws, to accept the concept of antigravity and to investigate some naturally occurring phenomena that could be related to antigravity.

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DISCUSSION AND CONCLUSIONS

Antigravity research is largely an exercise in serendipity and for me it began with the axial convergent capacitor and a series of high voltage and low voltage frequency response experiments. The results were totally unexpected and a lengthy analysis of the experimental data and observations led to The Antigravity (Electrogravitic) Hypothesis - "An electromagnetic field in a vortex-like configuration can generate an antigravity or gravity-like field that interacts with the mass of the device to generate a propulsive force and the mass of the electrons on the surface of the device to alter its electrical characteristics."

The most remarkable insight gained from these experimental investigations was that the antigravity phenomenon associated with the axial convergent capacitor is fundamentally an electromagnetic field phenomenon arising from the movement of electrons. The problem of reconciling this revelation with T.T. Brown's high voltage claims as well as those made by other antigravity researchers came to the forefront. Attention was first directed towards integrating the results from these experimental investigations with mainstream science's basic mass and electrical laws. Unfortunately our physical understanding of mass, charge and the various field / force generation processes associated with these physical entities can't even explain these laws much less the generation of a gravity-like field / force or antigravity.

The development of a conceptual model, the Zero Point Energy (ZPE) model, was undertaken to outline the energy characteristics of mass and charge that could explain their inherent properties and the basic field / force generation processes associated with them. The ZPE model was then integrated with the Antigravity (Electrogravitic) Hypothesis to explain antigravity. Although the ZPE model is conceptual in nature and must still

be validated, it offers some explanation for the wide range of claims being made by antigravity researchers and provides limited guidance to research and development initiatives associated with antigravity devices / machines. The ZPE model's most important contribution to science is its challenge to all engineers and scientists, mainstream and otherwise, ... develop a validated physical description of mass, charge and their related field / force generation processes that can at least explain our most basic mass and electrical laws.

The following conclusions and recommendations are based on the experiences and insights that I have gained from over a quarter century of antigravity research.

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Electrical, electromechanical and mechanical antigravity devices / machines can generate a gravity-like field / force and should be studied. The experimental investigations with the axial convergent capacitor arose from T.T. Brown's claims for his Electrokinetic Apparatus (United States Patent Number 3 187 206). Although the experimental findings reported here aren't in total agreement with Brown's the patent was a valuable starting point for these antigravity investigations. It is recommended that Brown's claims regarding his other antigravity devices be investigated to gather more insight and understanding of the phenomenon. For this same reason the antigravity devices / machines that were developed by J.R.R. Searl, E.J. Saxl, Agnew H. Bahnson, Viktor Schauberger, H.W. Wallace and E.R. Laithwaite should also be investigated as well as those of other antigravity researchers that show promise.

The Hutchison Effect discovered by J.K. Hutchison and Nikola Tesla's high voltage experiments may also prove to be fruitful areas to explore.

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A management strategy that constructively deals with real world reactions to antigravity research should be considered. Machiavelli's "The Prince" aptly describes the antigravity research situation.

"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things, because the innovator has for enemies all those who have done well under the old conditions, and lukewarm defenders in those who may do well under the new."

Unreasoning denial and fear that is in many instances concealed by a subterfuge of arrogance and ridicule aren't uncommon human reactions to change and the unknown. These were my concerns when I started this research over a quarter century ago and in part my experiences during the course of these investigations. Secrecy allows one to proceed relatively unhindered by ridicule and short sighted confrontational situations. I would recommend that individuals undertaking antigravity research give this type of management strategy serious consideration, at least until social and scientific attitudes to antigravity become more reasonable.

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Experimental investigations are considered the best way to study an antigravity device / machine at this time. Antigravity devices / machines can engender blind denial, awe, disbelief and maybe acceptance. Based on personal experience the steps from blind denial to acceptance are huge and disconcerting. The observations and conclusions derived from an antigravity study are contrary to one's background, education and training and can engender very disturbing personal reactions. Experimental investigations are recommended as the most practical and expedient way of dealing with antigravity related issues of a personal, professional and public nature.

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A rationale that can relate mainstream science to the operation of an antigravity device / machine is of fundamental importance to antigravity research. Experiments with the axial convergent capacitor led to The Antigravity (Electrogravitic) Hypothesis and ultimately a review of mainstream science that inspired the development of the Zero Point Energy model. The Zero Point Energy model, a conceptual model still to be validated, offers guidelines to a much more comprehensive and organized study of antigravity, outlines a possible way to physically describe mass, charge and the various field / force generation processes including antigravity and provides some basis for addressing the misconceptions and criticisms commonly associated with antigravity. The Zero Point Energy model challenges mainstream science to develop a more scientifically based approach to explaining our most basic mass and electrical laws and for that reason, if nothing else, should be investigated further.

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Antigravity and gravity research should be integrated together wherever possible to take advantage of any synergism that may exist between them. Antigravity investigations are engineering oriented and experimentally based whereas gravity research is typically of a scientific and theoretical nature. A combination of theory validated by experimental research would prove beneficial to all concerned. Antigravity researchers could manipulate the variables related to a device / machine, isolate cause and effect and finally design experiments that address the phenomenon while theoreticians focus on physically describing mass, charge and the various field / force generation relationships to obtain a coherent explanation for antigravity and very likely gravity.

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The possibility of antigravity being the root cause of some unexplained phenomena should be explored. The Hutchison Effect has shown that we can unwittingly generate fields that have effects going well beyond just antigravity. The bigger question is whether or not these types of fields can unknowingly be generated by some other means and we are just observing the result with no awareness or understanding of what is happening. Based on the claims made by researchers regarding antigravity machines that involve mass movement at essentially zero voltage, one possibility here would be the rotational movement of mass within the earth's core giving rise to a gravity-like field that ultimately travels to the surface to realize phenomena such as those claimed to be associated with the Bermuda Triangle and gravity hills where vehicles move uphill without any apparent form of propulsion. Researching these seemingly impossible claims based on the assumption that they are the result of a gravity-like field could open a new dimension to antigravity research and our understanding of science.

******

"The research presented here has focused on the social, scientific and technical challenges associated with antigravity. It is hoped that this research will engender a more responsible reaction to antigravity devices / machines and stimulate new thoughts and ideas related to science and unexplained phenomena." D.G. Vandenberghe

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APPENDIX

FREQUENCY RESPONSE ANALYSIS

Frequency response analyses are widely used by engineers to experimentally and theoretically evaluate the dynamic characteristics of electrical, mechanical, and hydraulic systems and to design linear control systems (Ogata, Katsuhiko, System Dynamics Second Edition , ISBN 0-13-589128-0 , Prentice Hall Inc. , Englewood Cliffs, New Jersey 07632). This analysis technique requires that the system be excited by a fixed amplitude variable frequency sinusoidal input,

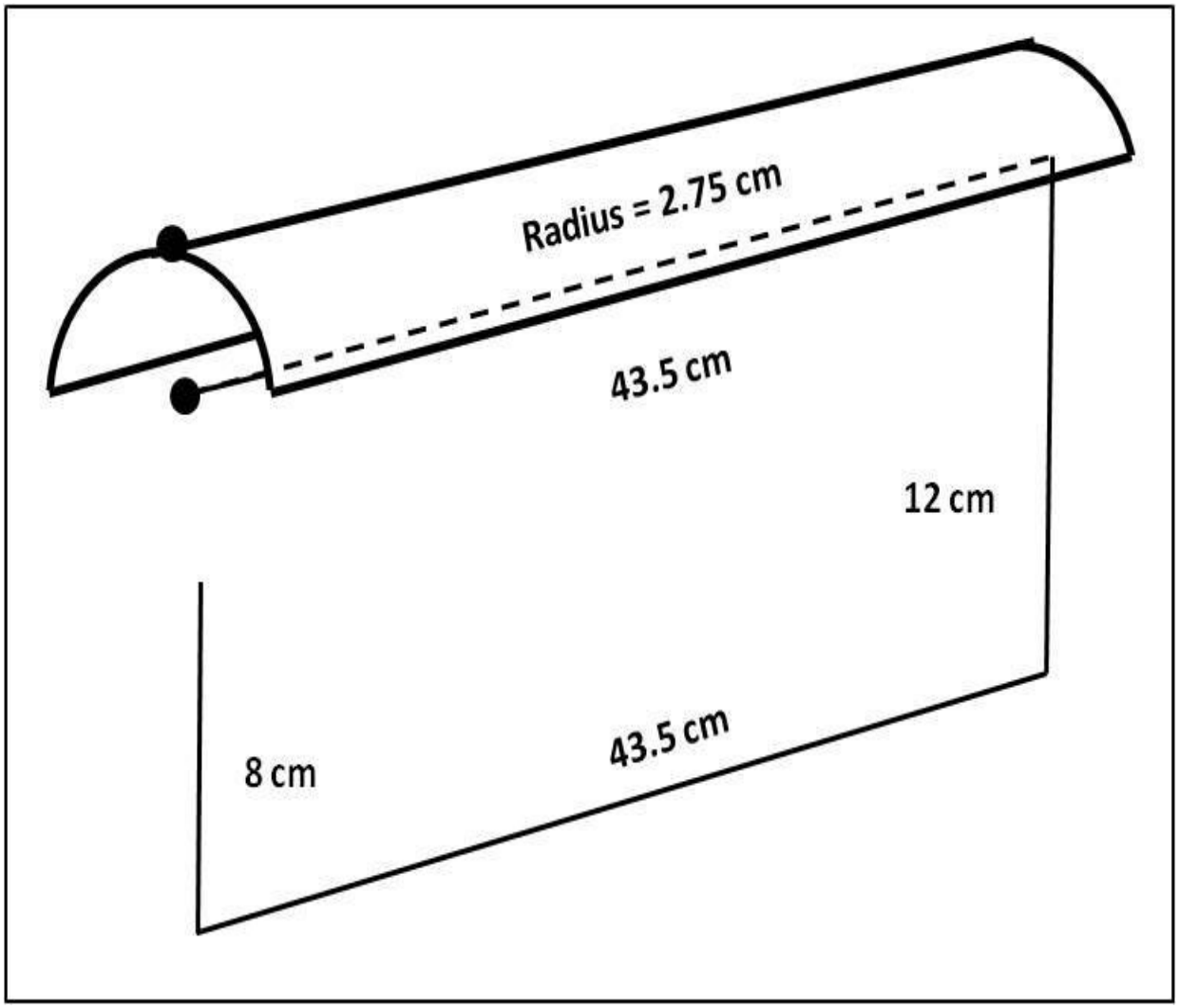
$$\mathbf{xi = Xi \sin wt ,}$$

where Xi and w are the amplitude and angular frequency of the input sinusoid. When the system output becomes sinusoidal,

$$\mathbf{xo = Xo \sin (wt + phi) ,}$$

the system's dynamic characteristics can be deduced from the output / input amplitude ratio, Xo / Xi , and the phase shift between the output and input sinusoids, phi .

Several frequency response experiments were conducted with the axial convergent capacitor.



Axial Convergent Capacitor

Frequency Response Analysis

Described here is one frequency response experiment and the subsequent analysis of the data to determine the axial convergent capacitor's electrical operating characteristics when a low voltage sinusoidal input waveform is used. The electrical circuit for this frequency response experiment is shown in the following diagram. The circuit consists of an operational amplifier with the axial convergent capacitor connected in series with a 1 megohm

resistor at its input and a 1 megohm feedback resistor. The amplifier's output voltage is inverted by the oscilloscope to obtain the test circuit's output voltage, eo . The test circuit's output and input voltages, eo and ei respectively, are shown on the oscilloscope screen for one data point. The vertical scale for the input voltage, ei , is 50 volts per (vertical) division and that for the output voltage, eo , is 2 volts per (vertical) division. The time scale is 0.0005 seconds per (horizontal) division.

The period of the input and output voltages, T , is

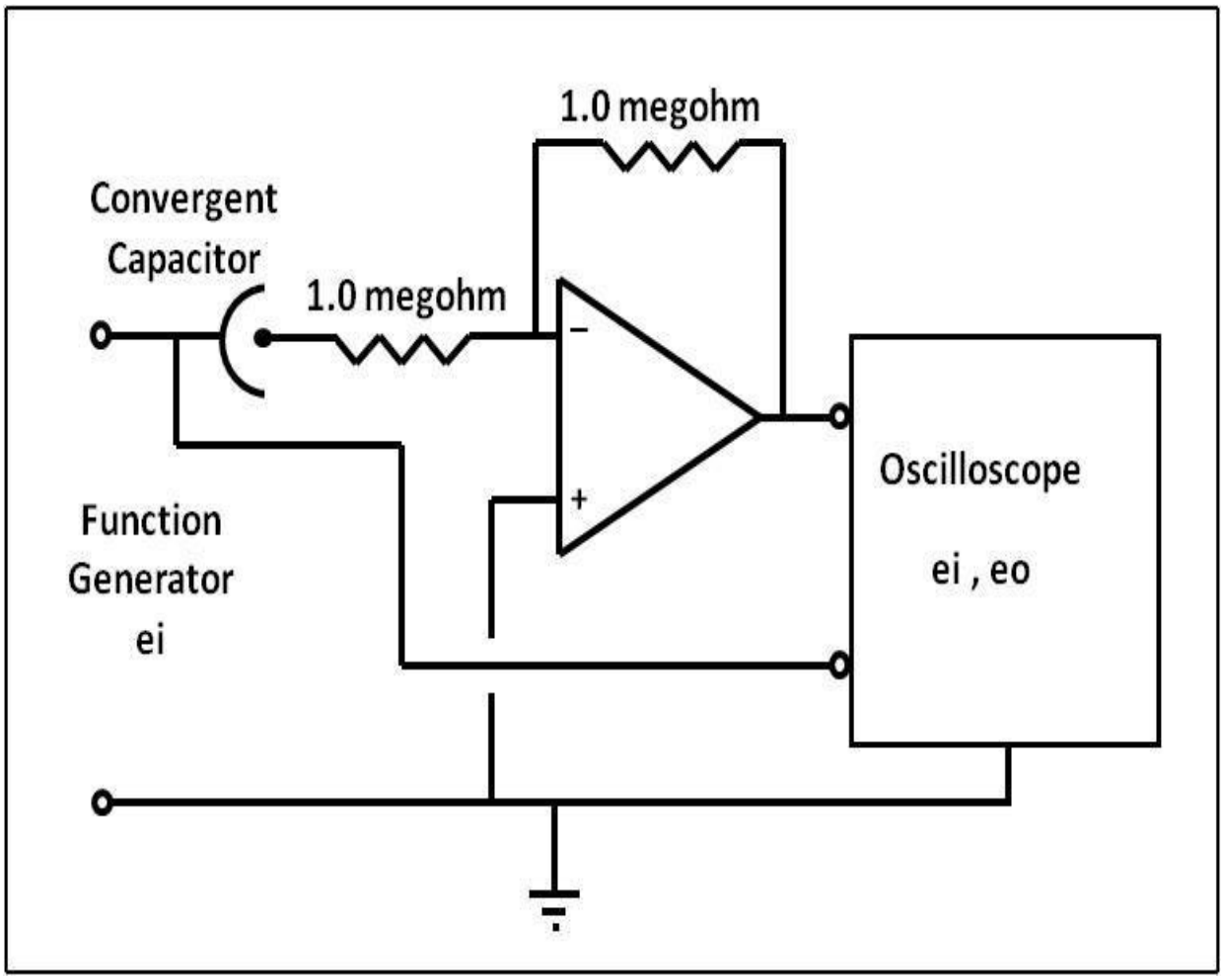
T = (0.0005 seconds / division) (5.0 divisions) = 0.0025 second

and the frequency of the input and output voltages is

f = 1 / T = 1 / 0.0025 = 400 Hertz.

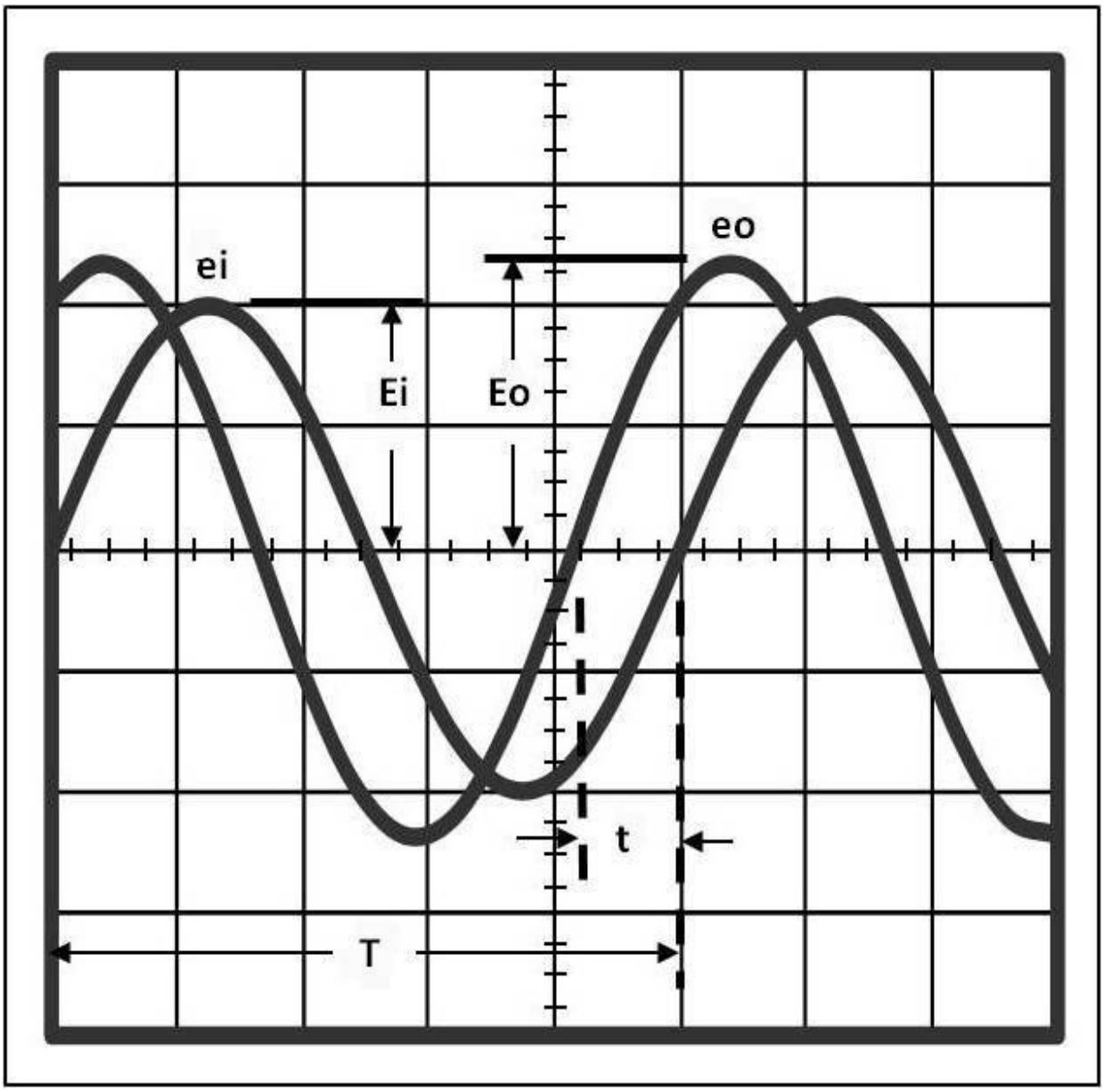
The corresponding angular frequency is

w = 6.283 f = 6.283 (400) = 2513.3 radians / second.



Electrical Test Circuit

Frequency Response Analysis



Oscilloscope

Frequency Response Analysis

Referring to the oscilloscope screen the amplitude of the sinusoidal input voltage is

Ei = (50 volts / division) (2 divisions) = 100 volts

and for the output voltage it is

Eo = (2 volts / division) (2.35 divisions) = 4.70 volts

At 2513.3 radians / second (400 Hertz) the output / input voltage amplitude ratio in decibels is

20 log10 [Eo / Ei] = 20 log10 [4.70 / 100] = - 26.6 decibels.

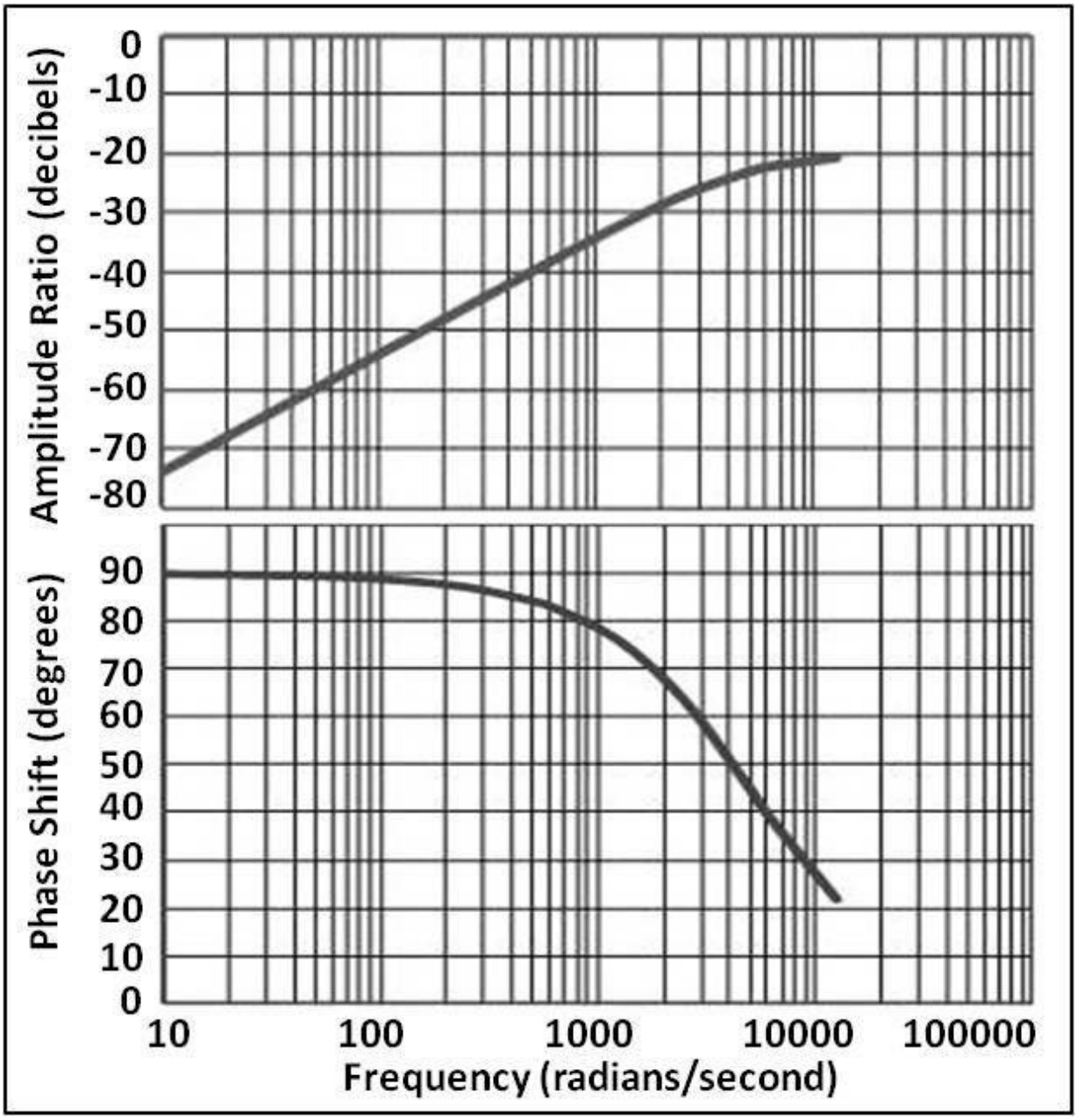
The output voltage, eo , leads the input voltage, ei , by

t = (0.0005 seconds / division) (0.85 divisions) = 0.000425 seconds

which corresponds to a phase shift of

360 t / T = (360) (0.000425) / (0. 025) = 61.2 degrees.

The output / input voltage amplitude ratio and phase shift have been determined at 2513.3 radians / second (400 Hertz). The complete data set for this frequency response experiment ranged from 12.57 radians / second (2 Hertz) to 12,570 radians / second (2000 Hertz) and the results are plotted on the Bode Diagram that follows. The Bode Diagram is the most convenient and comprehensive way of presenting frequency response data.



Bode Diagram

Frequency Response Analysis

The data from this frequency response experiment must now be used to analyze the test circuit, or more specifically determine the electrical

characteristics of the axial convergent capacitor. Assuming that the axial convergent capacitor is a pure capacitance, Cc , and denoting the operational amplifier's feedback resistance as Rf and its input resistance in series with the axial convergent capacitor as Rt , the test circuit's output / input voltage relationship in Laplace notation is

[eo(s) / ei(s)] = Rf Cc s / [1 + Rt Cc s] .

"s" is the Laplace operator. The right hand side of the equation is the test circuit's transfer function and for a sinusoidal input voltage it can be related to the frequency response data shown in the Bode diagram by simply substituting "jw" for the Laplace operator "s". That is,

Rf Cc (jw) / [1 + Rt Cc (jw)]

where "j" is the imaginary mathematical operator.

Rearranging the transfer function we obtain the output / input voltage amplitude ratio, Eo / Ei , as

Rf Cc w / [1 + (Rt Cc w)2]**1/2**

and the phase shift (degrees) between the output and input voltages as

90 – tan-1(Rt Cc w)

where tan-1 is the inverse tangent.

The only unknown in these amplitude and phase shift relationships is the convergent capacitor's electrical characteristics. Referring to the frequency response data presented in the Bode diagram the test circuit's amplitude ratio asymptotes to – 20 decibels at the higher frequencies where

$$\mathbf{Rf\ Cc\ w\ /\ [1 + (Rt\ Cc\ w)^{**}2]^{**}1/2 \approx Rf\ /\ Rt\ .}$$

The total resistance in series with the axial convergent capacitor is therefore

20 log10 [Rf / Rt] = - 20 decibels

Rf / Rt = 0.1

Rt = Rf / 0.1 = 1 [10**6] / 0.1 = 10 [10**6] ohms

Since the resistance of the resistor in series with the axial convergent capacitor is 1 [10**6] ohms for this test, the axial convergent capacitor has a series resistance effect of

Rc = 10 [10**6] – 1 [(10)**6] = 9 [(10)**6] ohms

The Bode diagram shows a 45 degree phase shift at a frequency of 5000 radians / second. Referring to the expression for phase shift

$$\mathbf{90 - tan\text{-}1(Rt\ Cc\ w) = 45}$$

the inverse tangent of 45 degrees is

Rt Cc w = 1

Therefore the axial convergent capacitor's capacitance is

Cc = 1 / [Rt w] = 1 / [(10 [10**6]) (5000)] = 20 [10**-12] farads

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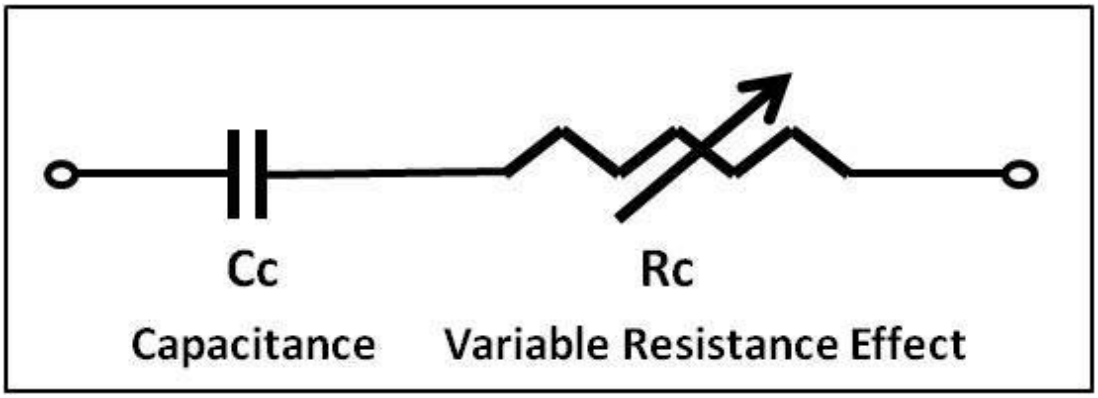
The axial convergent capacitor's electrical characteristics have been determined using the data from one frequency response experiment. Subsequent frequency response experiments showed that the axial convergent capacitor's capacitance, Cc , remained constant (20 [10**-12] farads) throughout the experiments but its resistance, Rc , varied for different test circuit arrangements. As a consequence the axial convergent capacitor's electrical operating characteristics are presented here as a capacitance in series with a variable resistance. The capacitor's variable resistance, Rc , for this experiment was 9 [10**6] ohms, and since the capacitor had no physical resistance associated with it, this resistance is actually a resistance effect or virtual resistance.



Axial Convergent Capacitor

Electrical Model

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APPENDIX

THE ZPE MODELELECTRICAL ANALYSES

The Electric Field / Electrostatic Force Analysis

The ZPE model of charge conceptualizes both the electron and proton at zero velocity as a spherical envelope of charge related free energy elements that are spinning as they orbit around their respective masses. The free energy elements at the outer perimeter of the envelope generate an electric field that emanates outward from the charge and the energy required to sustain this field is derived from the charge's mass / mass energy entity which in turn gets its energy from the surrounding energy aether. According to the ZPE electron and proton (charge) models the possible orbital and spin direction combinations that the charge related free energy elements can assume for any one charge are CCW/LHR, CCW/RHR, CW/LHR or CW/RHR. The ZPE models for any two charges are as follows.

Charge 1	Charge 2
CW/LHR	CW/LHR
CW/RHR	CW/RHR
CCW/LHR	CCW/LHR
CCW/RHR	CCW/RHR

The ZPE model of charge must satisfy Coulomb's Law, like charges repel and unlike charges attract each other. The unique like charge combinations are

>> CW/LHR - CW/LHR

>> CW/RHR - CW/RHR

>> CCW/LHR - CCW/LHR

>> CCW/RHR - CCW/RHR

The unique unlike charge combinations are

>> CCW/LHR - CCW/RHR

>> CCW/LHR - CW/LHR

>> CCW/LHR - CW/RHR

>> CW/LHR - CCW/RHR

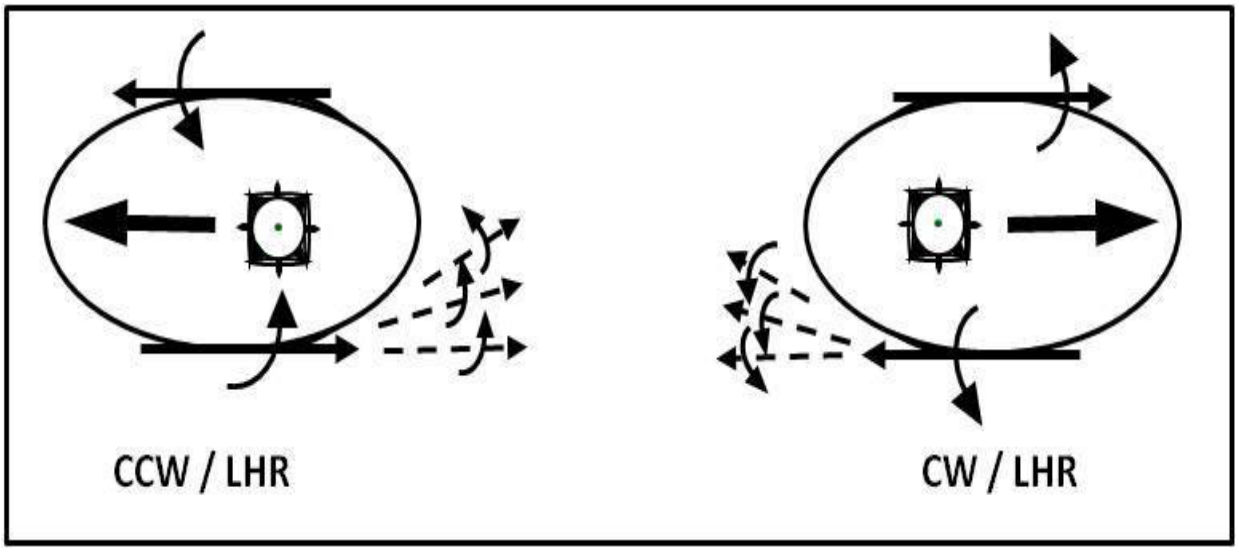
>> CW/LHR - CW/RHR

>> CW/RHR - CCW/RHR.

The electric field / electrostatic force generation characteristics for the various possible unlike charge combinations are illustrated in the following diagrams. The direction of travel and spin of the charge related free energy elements are indicated by the solid arrows tangent to their ellipse like path. The electric field being generated by the charge's charge related free energy elements is shown by the dashed arrows with the direction of spin indicated. The electric field's rotational energy or spin is transmitted through the energy aether that surrounds it. If the spin of the electric field is in the same direction as that of the charge related free energy elements that the field is impinging upon then the charge related free energy elements are accelerated in the direction they are travelling. Otherwise, they are decelerated. The elliptical shape of the charge related free energy envelope represents the trajectory taken by the charge related free energy elements when influenced by the electric field from another charge. The electrostatic force acting on each charge, depicted by the bold black arrow at the centre of the charge, arises from the ellipse-like distortion of the charge related free energy element envelope by the impinging electric field. When the electrostatic forces are pointing towards each other the charges are attracted to each other and if they are pointed away from each other the charges are repelling one another. The ZPE electron and proton (charge) models that satisfy

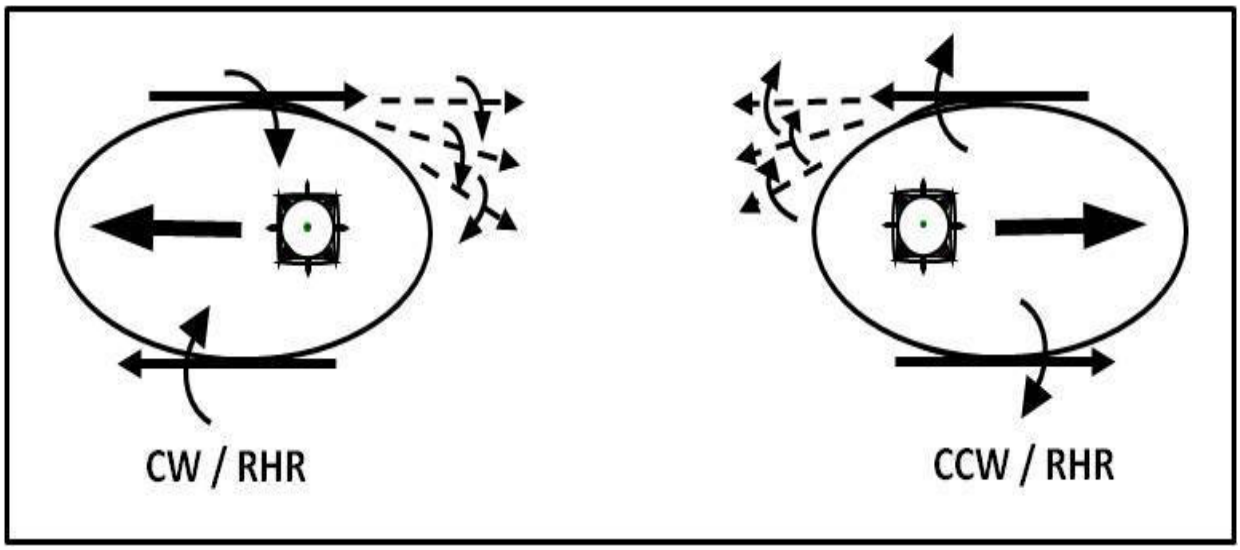
Coulomb's Law, like charges repel and unlike charges attract each other, are valid ZPE model possibilities.

As shown in the following two illustrations the unlike charge combinations CCW /LHR - CW/LHR and CW/RHR – CCW/RHR generate electrostatic forces that cause the charges involved to be repelled from each other. These unlike charge combinations do not satisfy Coulomb's Law and therefore are not valid ZPE model charge combinations.



Electric Fields / Electrostatic Forces

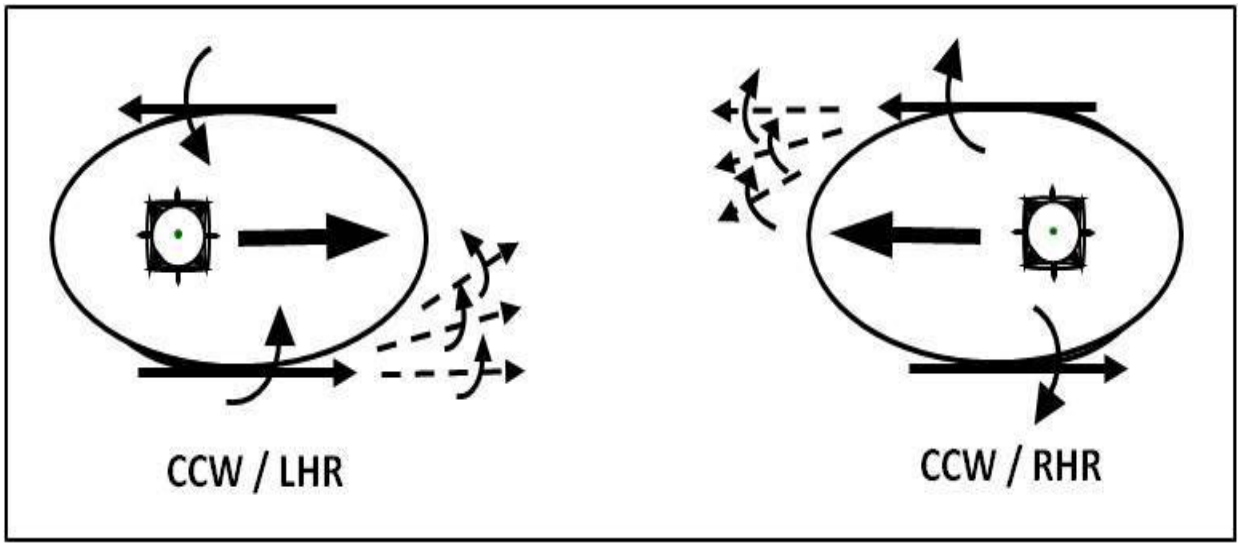
(CCW/LHR – CW/LHR)



Electric Fields / Electrostatic Forces

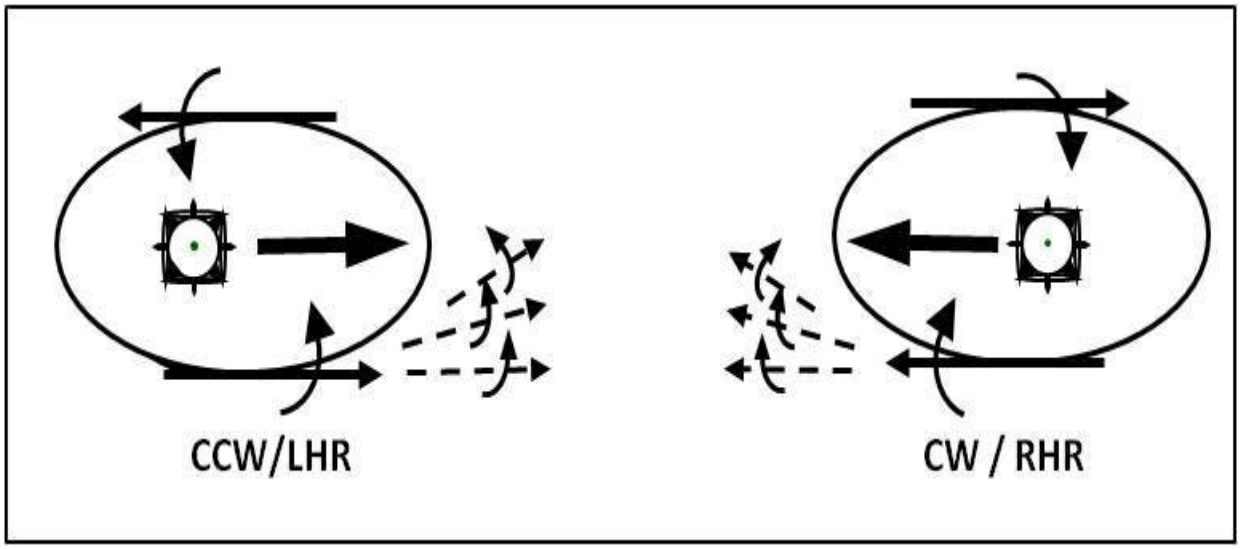
(CW/RHR – CCW/RHR)

The following four illustrations show the remaining dissimilar charge combinations being attracted to each other and therefore satisfying Coulomb's Law.



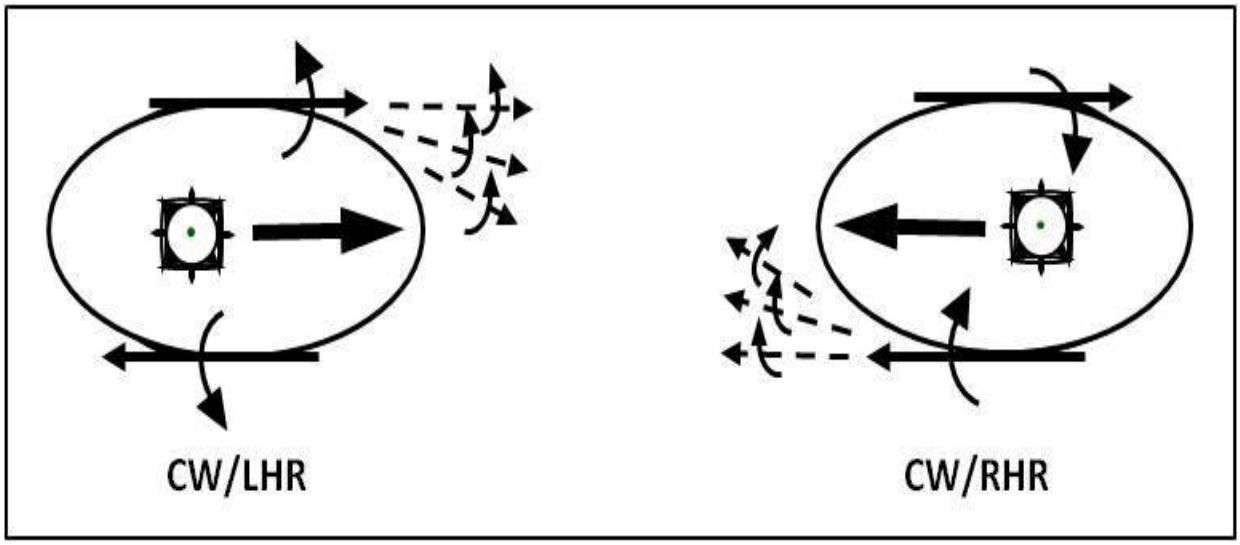
Electric Fields / Electrostatic Forces

(CCW/LHR – CCW/RHR)



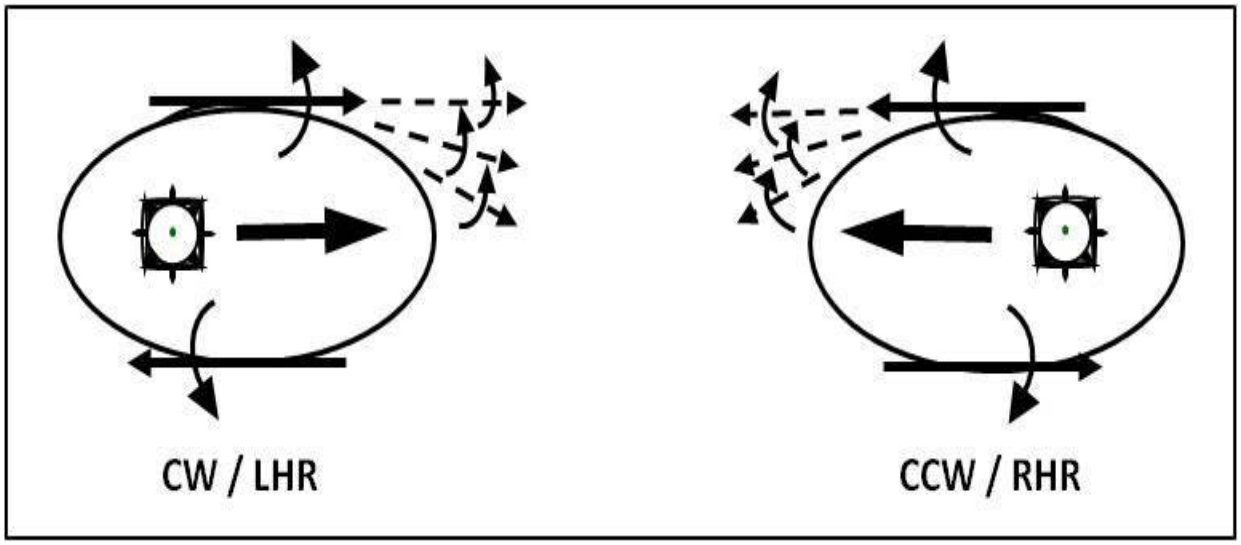
Electric Fields / Electrostatic Forces

(CCW/LHR - CW/RHR)



Electric Fields / Electrostatic Forces

(CW/LHR – CW/RHR)



Electric Fields / Electrostatic Forces

(CW/LHR – CCW/RHR)

The four dissimilar charge combinations that generate electrostatic forces attracting the charges together are

>> CCW/LHR - CCW/RHR

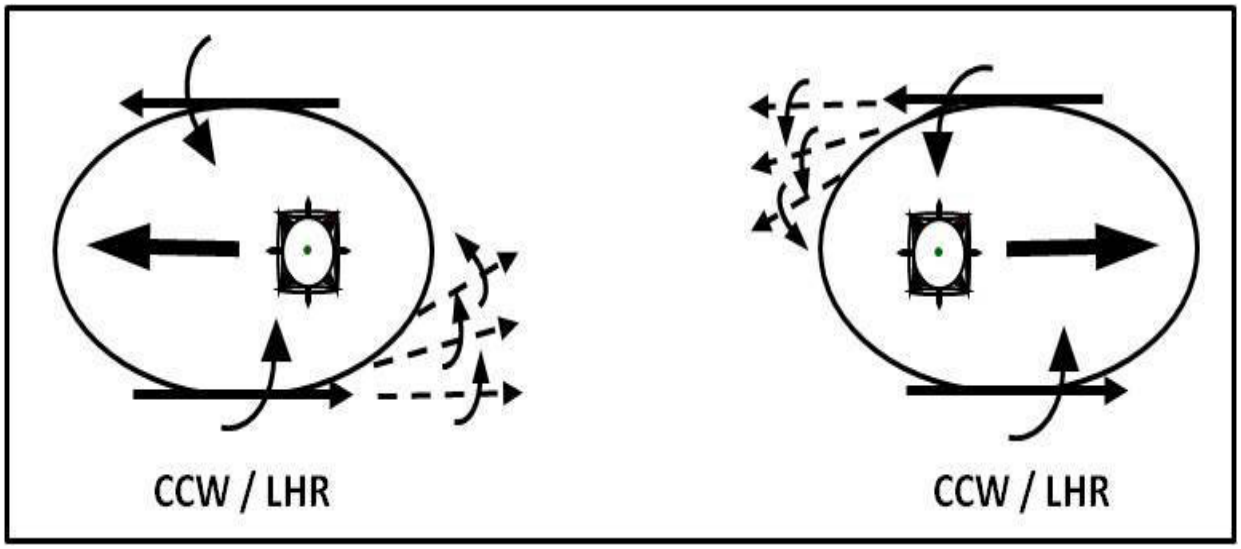
>> CCW/LHR - CW/RHR

>> CW/LHR - CW/RHR

>> CW/LHR - CCW/RHR.

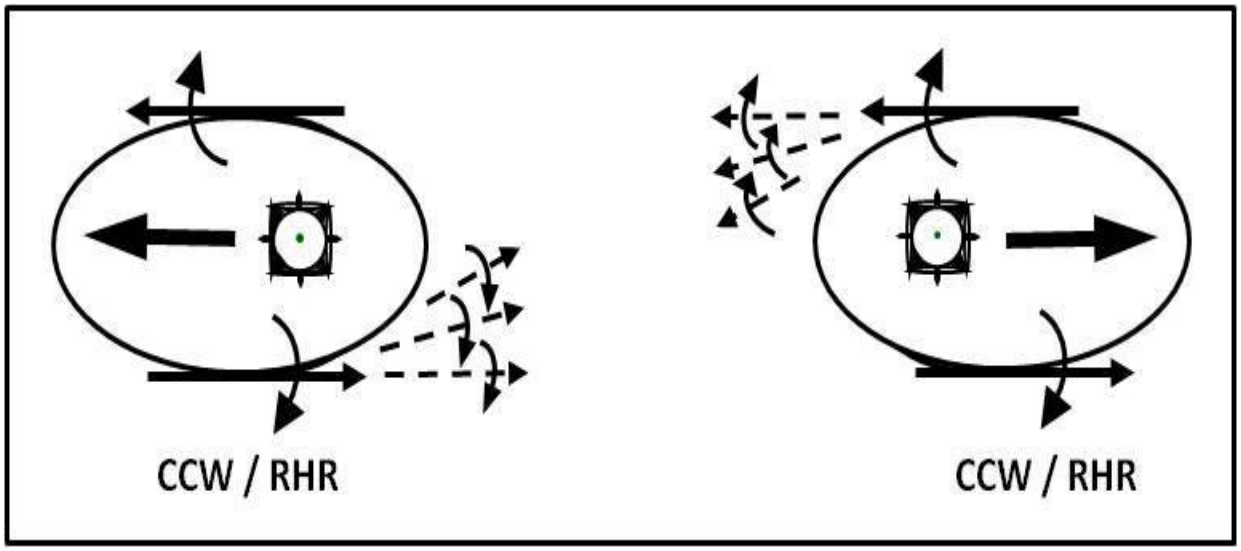
The individual charges making up these charge combinations, CCW/LHR, CCW/RHR, CW/LHR and CW / RHR, will now be paired with themselves

to determine if they generate the repulsive electrostatic forces predicted by Coulomb's Law.



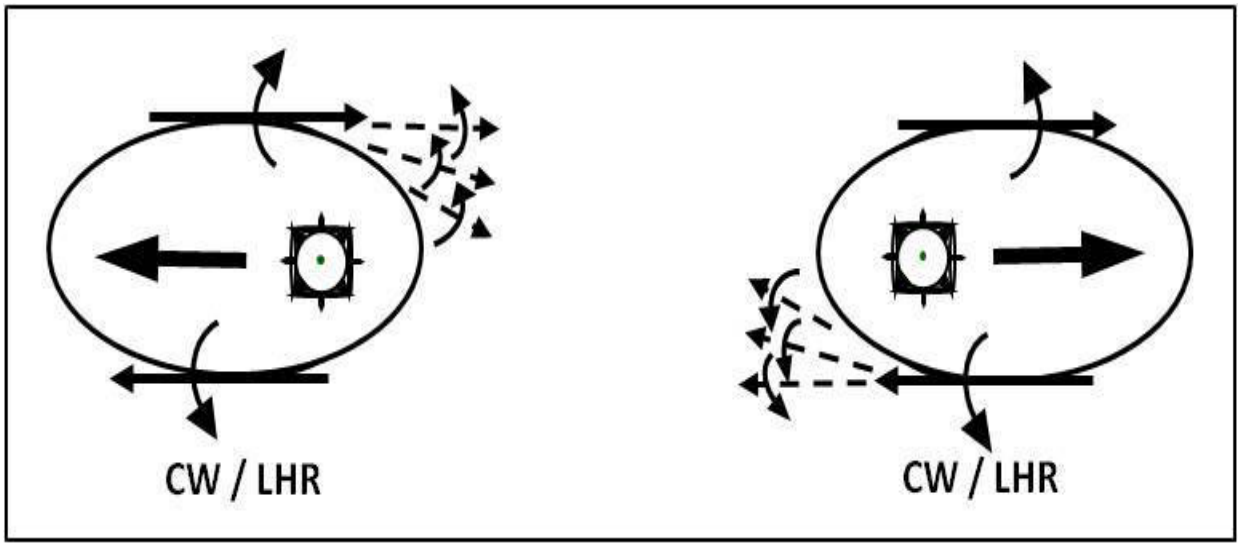
Electric Fields / Electrostatic Forces

(CCW/LHR – CCW/LHR)



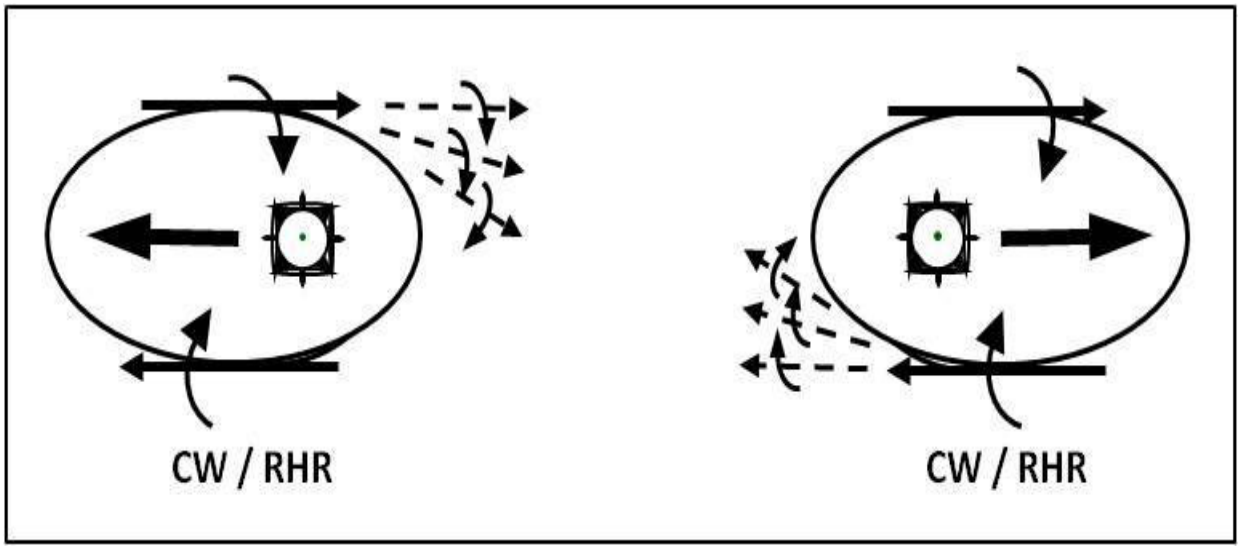
Electric Fields / Electrostatic Forces

(CCW/RHR – CCW/RHR)



Electric Fields / Electrostatic Forces

(CW/LHR – CW/LHR)



Electric Fields / Electrostatic Forces

(CW/RHR – CW/RHR)

The individual charges, CCW/LHR, CCW/RHR, CW/LHR and CW / RHR, all generate a repulsive electrostatic force when paired with themselves as per Coulomb's Law for like charges.

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The electron / proton combinations

>> CCW/LHR - CCW/RHR

>> CCW/LHR - CW/RHR

>> CW/LHR - CW/RHR

>> CW/LHR - CCW/RHR

are valid ZPE model possibilities with regard to satisfying Coulomb's Law. The question that still remains is which is the electron and which is the proton with respect to these unique charge combinations.

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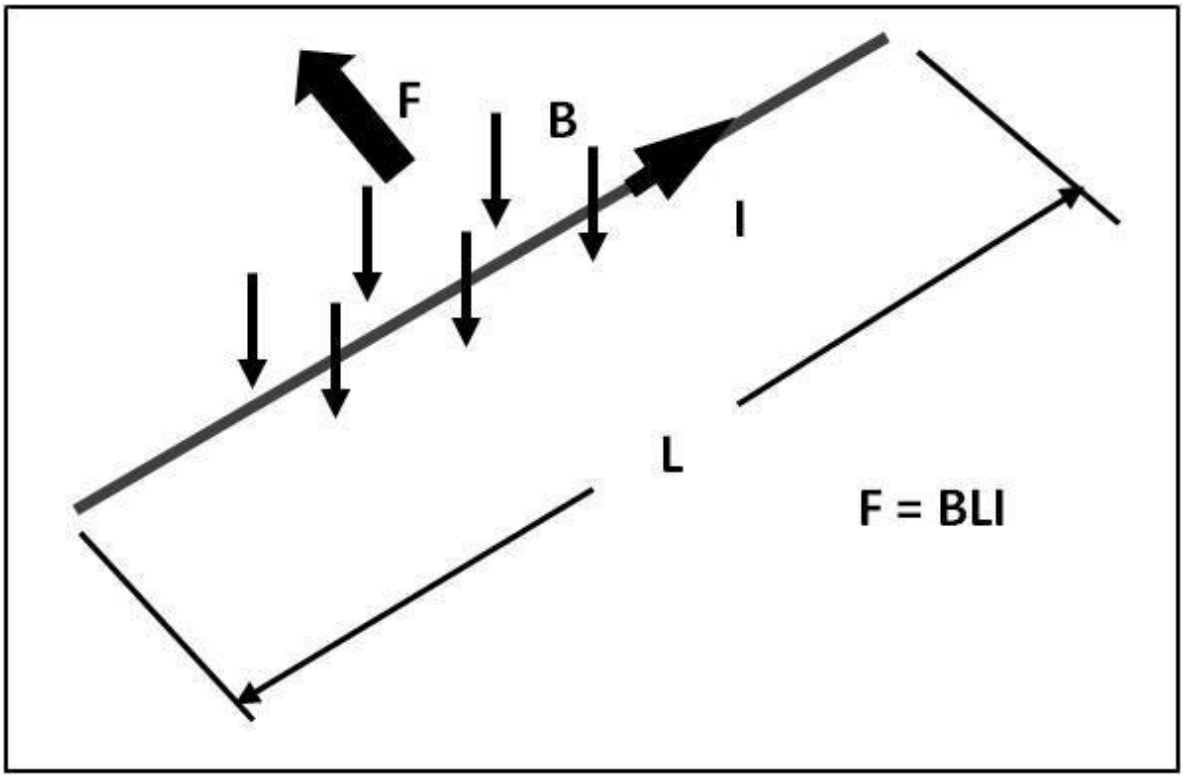
The (Electro)magnetic Field / Force Analysis

The (electro)magnetic field / force relationship that the ZPE model must satisfy is illustrated in the following sketch. The magnitude of the transverse force, F , is defined by the relationship, F = B L I , where the (electro)magnetic field , B , is perpendicular to the current, I , that is travelling along a wire of length, L. The force, the bold arrow perpendicular to the current carrying wire and the field, is in the direction the palm of the right hand is facing when the thumb is pointed in the direction of the current and the fingers are in the direction of the magnetic field. When the (electro)magnetic field is parallel to the charge's movement the resultant transverse force, F , is zero.



The (electro)magnetic field, B , is generated by electrons and therefore it will have the same spin as the electron's charge related free energy elements.

Therefore, if an (electro)magnetic field with an LHR spin is assumed the following charge combinations that could satisfy Coulomb's Law must consider the charge with an LHR spin to be an electron and the other a proton.

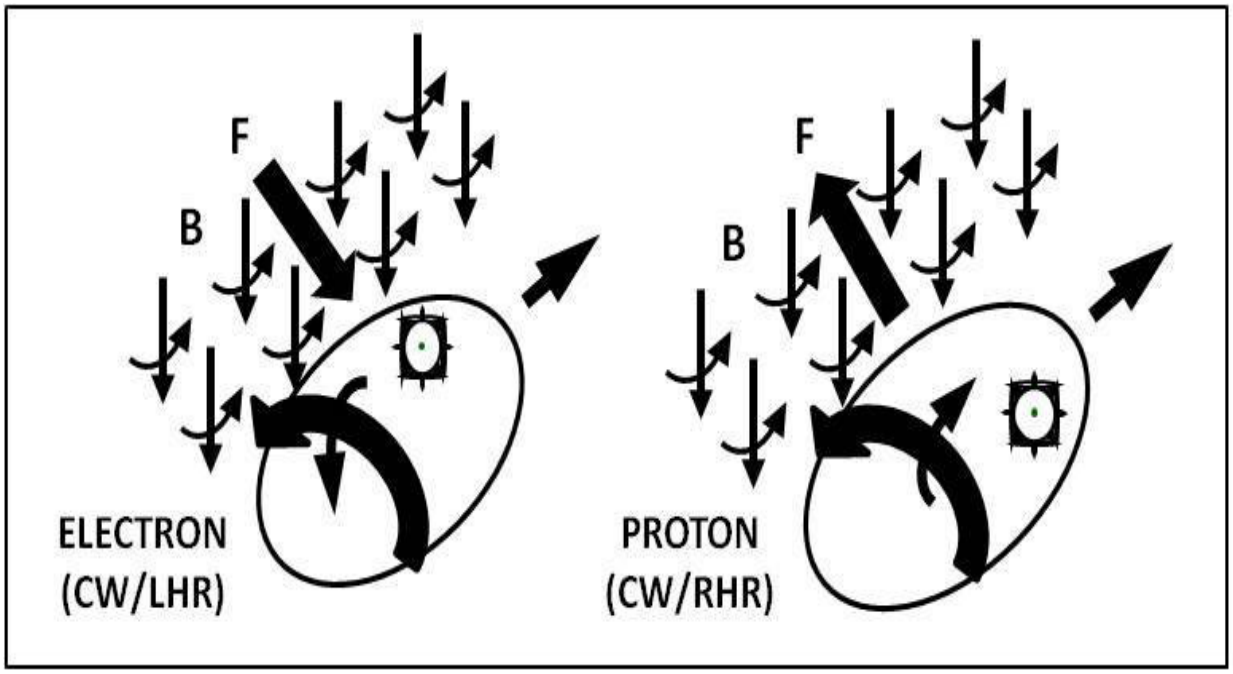
>> CW/LHR - CW/RHR

>> CW/LHR - CCW/RHR

>> CCW/LHR - CCW/RHR

>> CCW/LHR - CW/RHR

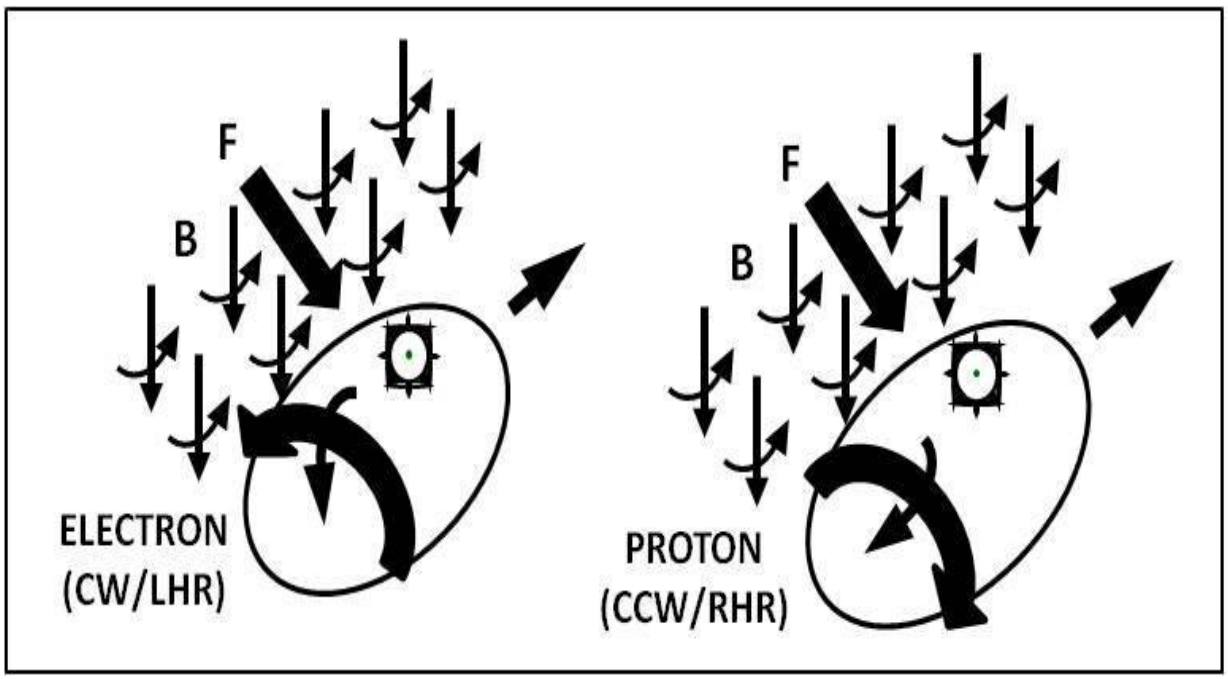
An analysis of these four possible electron / proton combinations that could satisfy both Coulomb's Law and the (electro)magnetic field / force relationship when the (electro)magnetic field has an LHR spin follows. The direction and spin of the (electro)magnetic field, B , and the electromagnetic field surrounding the moving charge are indicated in the illustrations. When the field's spin complements the spin of the electromagnetic field surrounding the moving charge, the charge related free energy elements making up the charge's electromagnetic field are accelerated in the direction they are moving and vice versa if the opposite is the case. The imbalance caused by the (electro)magnetic field interacting with a moving charge's charge related free energy elements is altered by the charge's electromagnetic field. That is, the electromagnetic field, which is basically a net rotation of the charge related free energy elements about a moving charge, is assumed to shift the imbalance caused by the (electro)magnetic field by ninety degrees in the direction of rotation of the charge's electromagnetic field. The resultant energy imbalance associated with the charge related free energy envelope causes a force (bold black arrow) to be generated perpendicular to the charge's movement and the (electro)magnetic field, B . The charge's mass is at the leading edge and to the side of the charge related free energy envelope due to the interaction of the moving charge's charge related free energy elements with the surrounding energy aether.



Electron(CW/LHR) - Proton(CW/RHR)

Field(LHR) / Force

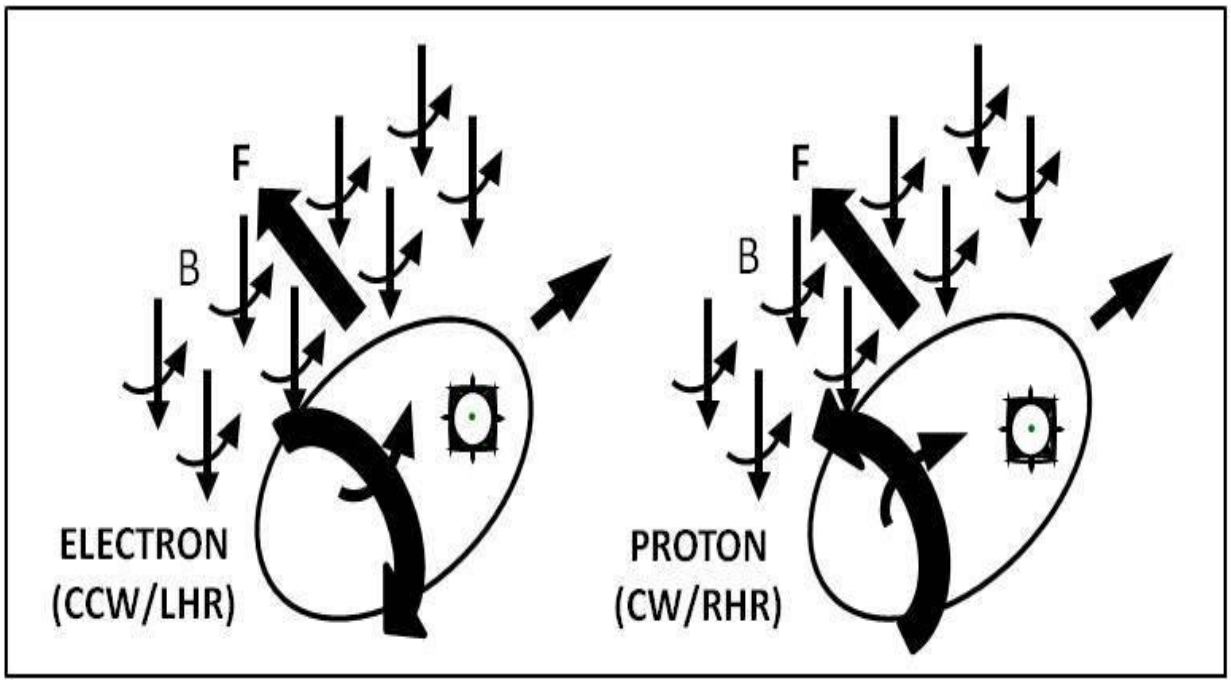
The force generated by the electron and the proton is in the correct direction and therefore this electron / proton combination is a valid possibility for an (electro)magnetic field with an LHR spin.



Electron(CW/LHR) - Proton(CCW/RHR)

Field(LHR) / Force

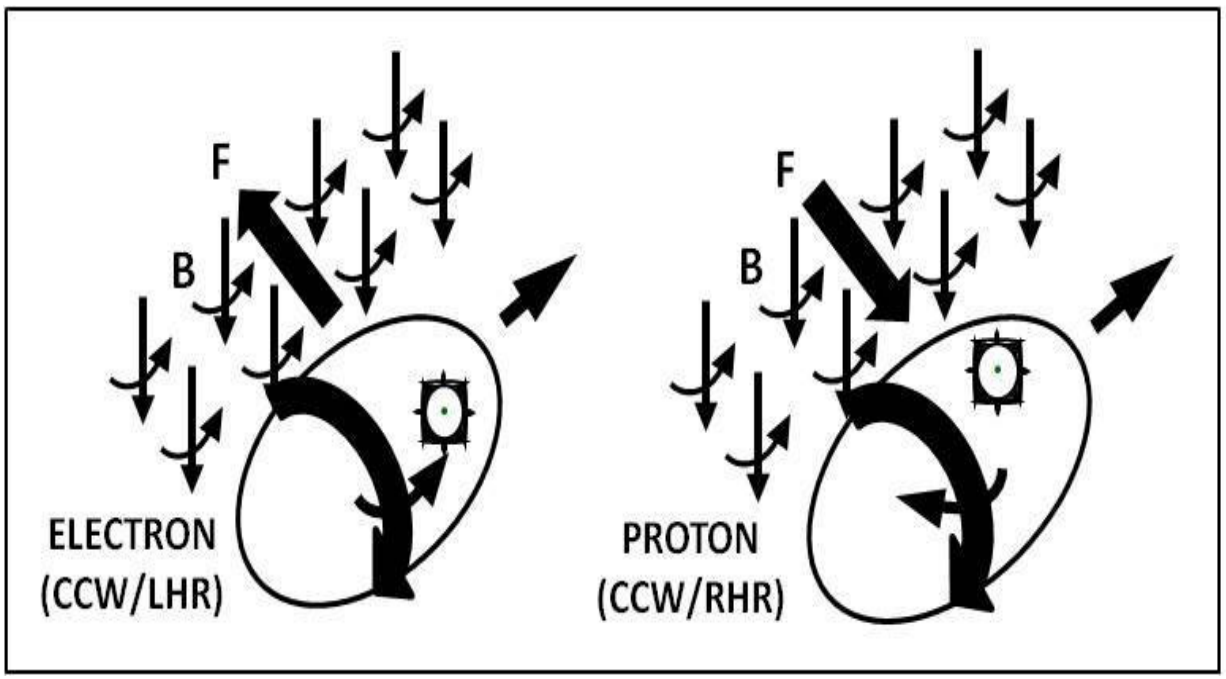
The direction of the force generated by the electron is correct but that for the proton is incorrect. This is an invalid electron / proton combination for an (electro)magnetic field with an LHR spin.



Electron(CCW/LHR) - Proton(CW/RHR)

Field(LHR) / Force

The direction of the force generated by the proton is correct but that for the electron is incorrect. This is an invalid electron / proton combination for an electromagnetic field with an LHR spin.



Electron(CCW/LHR) - Proton(CCW/RHR)

Field(LHR) / Force

The direction of the force generated by both the electron and proton is incorrect. This is an invalid electron / proton combination for an electromagnetic field with an LHR spin.

In summary the electron (CW/LHR) - proton (CW/RHR) combination could possibly satisfy both Coulomb's Law and the (electro)magnetic field / force relationship when the (electro)magnetic field has an LHR spin.

The possible electron / proton combinations that could satisfy both Coulomb's Law and the (electro)magnetic field / force relationship, F = B L I, for an (electro)magnetic field with an RHR spin are as follows. In each

case the electron would have an RHR spin and the other would be a proton with an LHR spin.

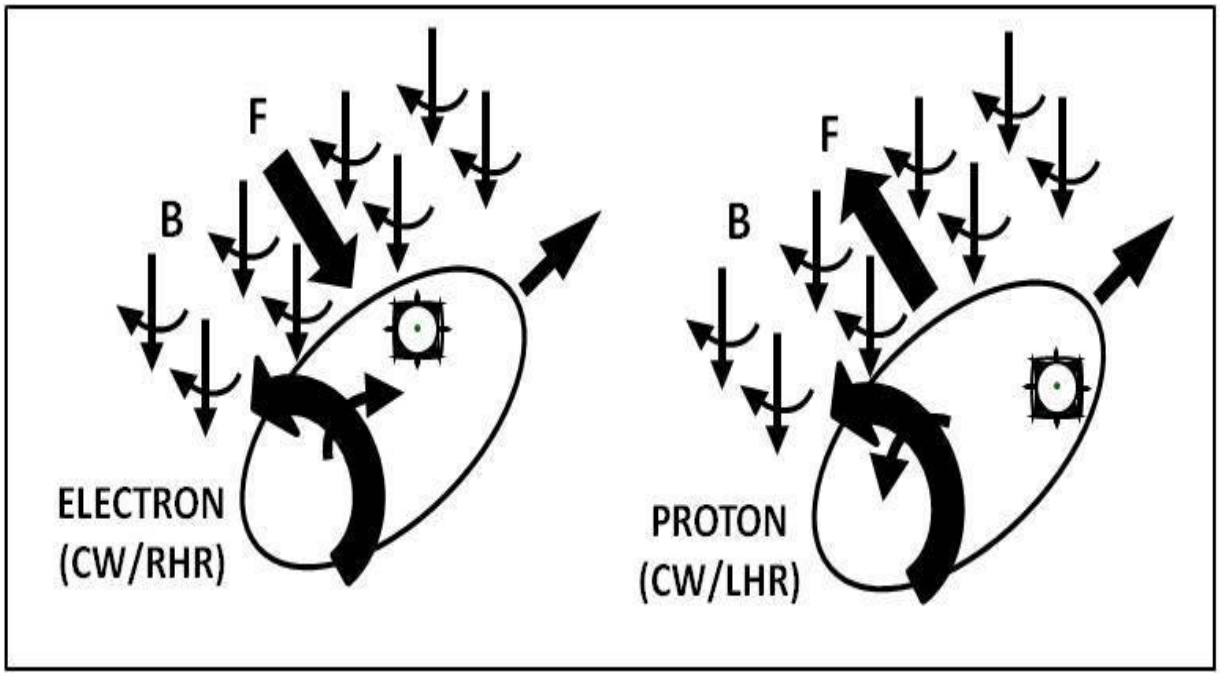
>> CW/RHR - CW/LHR

>> CW/RHR - CCW/LHR

>> CCW/RHR - CW/LHR

>> CCW/RHR - CCW/LHR

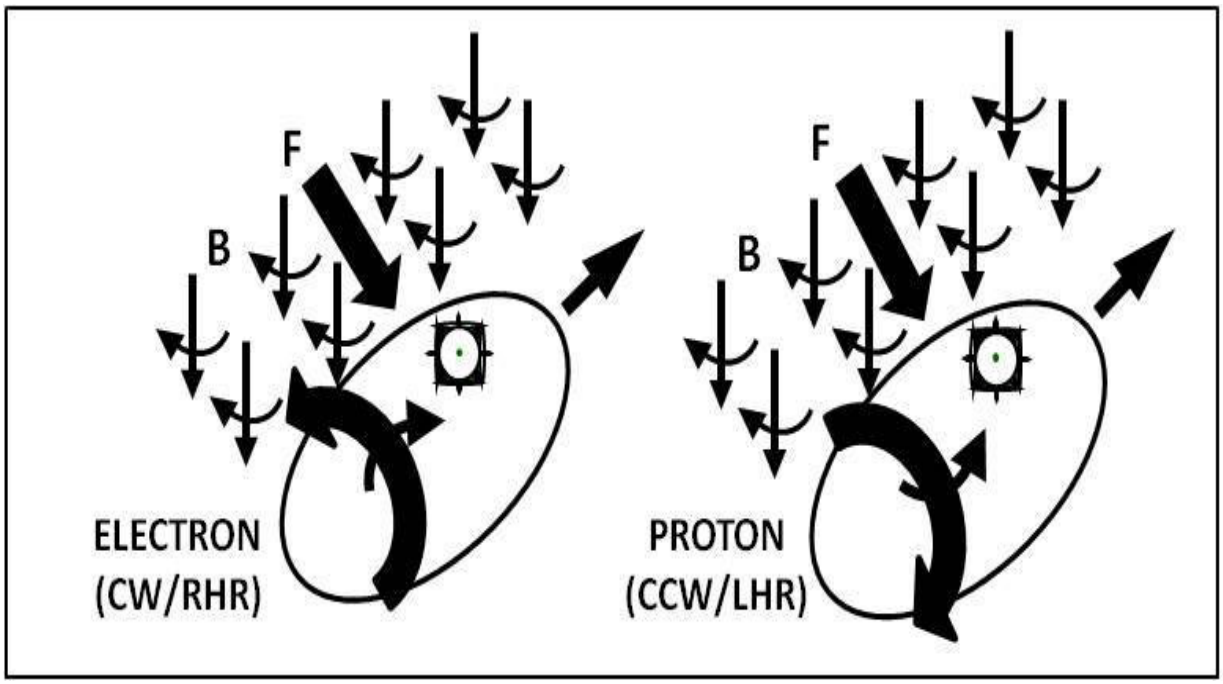
The following is an analysis of these four possible charge combinations when the (electro)magnetic field has an RHR spin.



Electron(CW/RHR) - Proton(CW/LHR)

Field(RHR) / Force

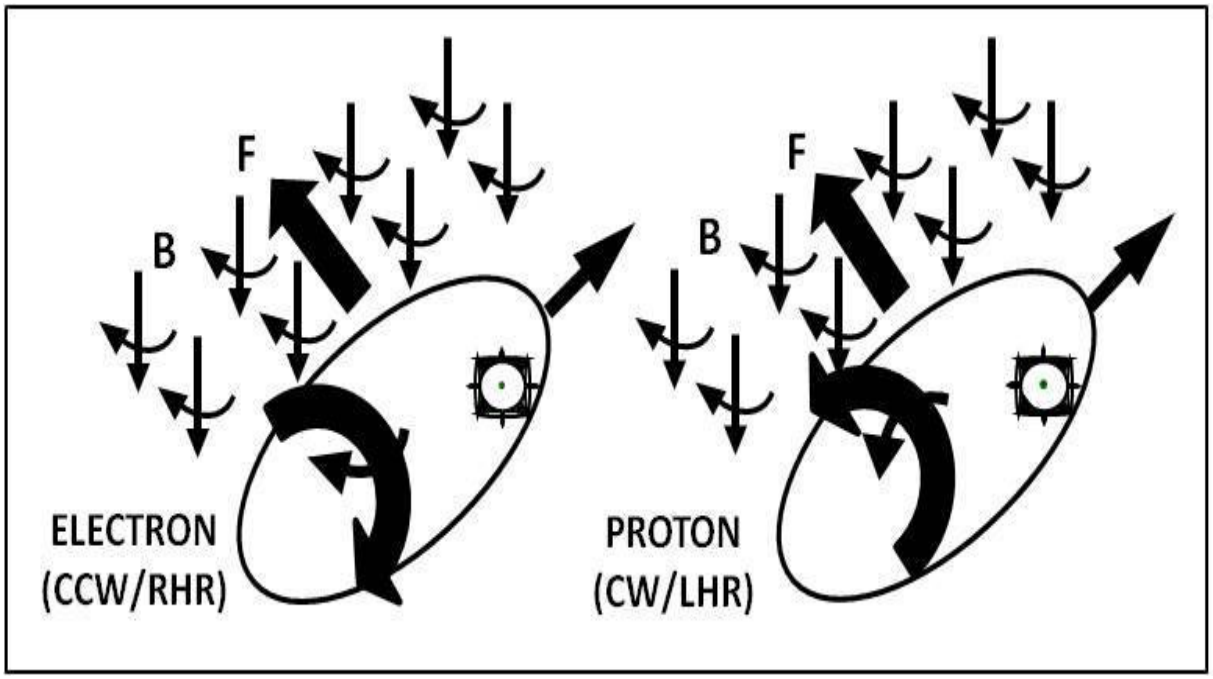
The force generated by the electron and the proton is in the correct direction and therefore this electron / proton combination is a valid possibility for an (electro)magnetic field with an RHR spin.



Electron(CW/RHR) - Proton(CCW/LHR)

Field(RHR) / Force

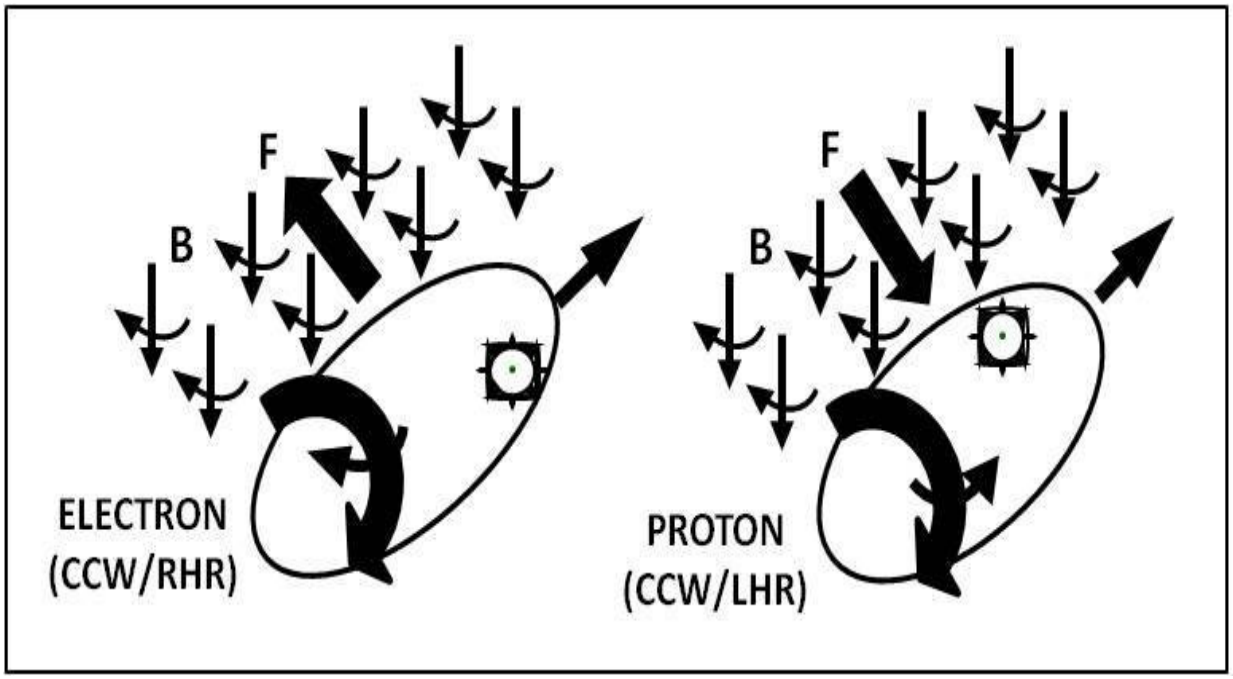
The direction of the force generated by the electron is correct but that for the proton is incorrect. This is an invalid electron / proton combination for an (electro)magnetic field with an RHR spin.



Electron(CCW/RHR) - Proton(CW/LHR)

Field(RHR) / Force

The direction of the force generated by the proton is correct but that for the electron is incorrect. This is an invalid electron / proton combination for an (electro)magnetic field with an RHR spin.



Electron(CCW/RHR) - Proton(CCW/LHR)

Field(RHR) / Force

The direction of the force generated by both the electron and proton is incorrect. This is an invalid electron / proton combination for an (electro)magnetic field with an RHR spin.

In summary the electron (CW/RHR) - proton (CW/LHR) combination could satisfy both Coulomb's Law and the (electro)magnetic field / force relationship for an (electro)magnetic field having an RHR spin.

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The ZPE model of the electron / proton combinations that could satisfy the field / force relationship, F = B L I , and Coulomb's Law, F = k q1 q2 / r**2 , for an (electro)magnetic field with an LHRspin is

>> (Electro) magnetic field (LHR) / Electron (CW/LHR) - Proton (CW/RHR)

and for an (electro)magnetic field with an RHR spin it is

>> (Electro)magnetic field (RHR) / Electron (CW/RHR) - Proton (CW/LHR)

When the (electro)magnetic field is parallel to the charge's direction of movement its charge related free energy envelope, although distorted by the field, remains rotationally balanced about its direction of movement and there is no transverse force being generated, F = B L I = 0 .

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About the Author

Dr. Douglas Vandenberghe, a professional engineer, began his career in the nuclear industry as an assistant reactor shift supervisor. He went on to develop nuclear reactor components and computer simulations of reactor shutdown systems and loss of coolant accidents for the CANDU nuclear reactor. He integrated his energy related research with his antigravity interests at the University of Regina, Saskatchewan, Canada, and completed a series of antigravity experiments. After leaving the University of Regina he undertook the daunting task of explaining the highly unusual results from his experiments. He completed a critique of mainstream science's long standing mechanical and electrical laws followed by the development of a conceptual energy based model, the Zero Point Energy model. This model, which links mass and electricity together, offers an explanation for science's mechanical and electrical laws, his experimental results and many of the claims made by other antigravity researchers. His antigravity research to date is documented in this eBook, ENGINEERING, SCIENCE and ANTIGRAVITY Challenging the Challenges.

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